OCTOBER 7, 1937 FIRST AERO WEEKLY IN THE WORLD REGD AT THE G.P.O. AS A NEWSPAPER

# FLIGHT

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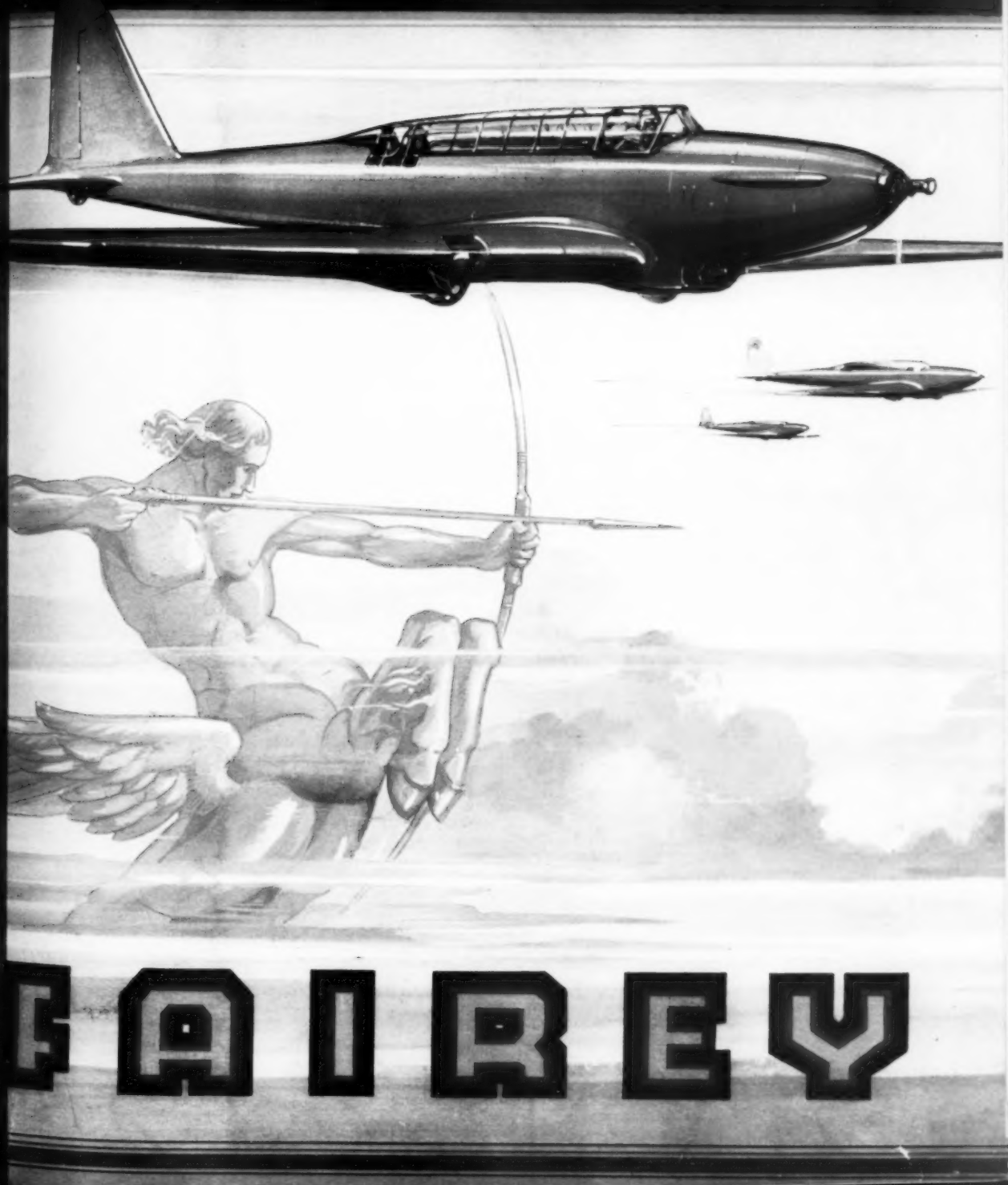

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# FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor
C. M. POULSEN

Managing Editor
G. GEOFFREY SMITH

Chief Photographer
JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (50 lines).

HERTFORD ST., COVENTRY. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.

GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2. Telegrams: Autopress, Birmingham. Telephone: Midland 2971.

260, DEANSGATE, MANCHESTER, 3. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.

26B, RENFIELD ST., GLASGOW, C.2. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 13 0, 6 months, 16s. 6d. 3 months, 8s. 6d. Other Countries: Year, £1 16 0. 6 months, 18s. 0d. 3 months, 9s. 0d.

No. 1502. Vol. XXXII. OCTOBER 7, 1937. Thursdays, Price 6d.


# The Outlook

## Off the Peg

IT would be idle to pretend that there is no cause for misgivings concerning the increasing use being made by air route operators at home and overseas of foreign aircraft. The unfortunate position in which we now find ourselves has come about in a perfectly natural way. At first the number of orders that could be counted upon by an aircraft manufacturer was too small to justify him in producing special types for special conditions. Then came the R.A.F. expansion, which roped in every firm capable of producing complete aircraft or smaller components. These firms are now mostly working to capacity, and they can scarcely be blamed for plumping for the ensured continuity of orders from the Air Ministry rather than for the somewhat problematical order from operating firms.

A very praiseworthy attempt is now being made to examine the possibility of evolving a sort of standardised specification which would meet the needs of operators of internal air lines and, if possible, also be acceptable to operators in British countries overseas.

It is believed that the idea originated in one of the Air Ministry departments; in fact, it was foreshadowed in the report of the Maybury Committee. As a basis for discussion has been taken an aircraft rather larger than those hitherto produced for short-haul air routes but a good deal smaller than the flying boats and landplanes being built for the long-distance routes of Imperial Airways—something with accommodation for about twenty passengers.

The fundamental idea seems to be that if a number of operators could agree on a specification, and would undertake to order a certain number of machines fulfilling the requirements of the specification, the aircraft constructor would be sure of definite orders for twenty-five or thirty aircraft, for example. That would enable him to know beforehand his immediate market, and should result in a considerable reduction in production costs.

## Some Snags

ATTRACTIVE as is the scheme on the surface, it is to be feared that it will not succeed. To secure unanimity concerning what is required will be difficult enough. Every modern device known to the aircraft designer will have to be incorporated if the standardised type is to have any hope of not becoming out of date before the last of the batch is delivered. If it is ordered "off the drawing board," there is risk of snags cropping up in an unexpected direction. If a prototype has to be built first and thoroughly tested, it will probably be two years before deliveries in any quantity could be expected.

Other practical points, such as the need of some sort of guarantee by the Air Ministry that the constructor selected will, in fact, receive the order for the stipulated number of machines, are too obvious to need stressing.

The suggestion has been made that a competition should be held. That suggestion can be dismissed at once. No competition of the sort has ever produced anything worth having, and when, a couple of years ago, the Air Ministry offered a prize, no interest whatever was shown in it by the industry for the very good reason that the prize offered was quite insufficient to cover the cost of producing a machine, even if it were certain of winning the competition.

## "Landing-Sticks"

THE mishap to *Courtier* in Phaleron Bay focuses attention on a risk which has been with us since the early days of flying. When the sea is as smooth as glass it is very difficult for a pilot to judge his exact height above the surface. If at the same time the horizon is obscured by haze, as will often be the case, his difficulties are increased. It seems likely that it was a set of circumstances such as these which led to the accident and, unfortunately, the loss of three lives.

In some ways flying boats are more favourably placed than landplanes in this matter of alighting in conditions of "difficult" visibility. Unless it has to come in over a crowded anchorage the boat will usually have an approach much less cluttered up by obstructions, so the approach can be begun farther away from the actual point of touchdown and made more gradual. On the other hand, unless there is fog at the time, the landplane pilot *can* judge his height during any part of the approach and is unlikely to "fly into the ground."

That this danger of a glassy surface was realised almost from the very beginning of seaplane flying is shown by the fact that as long ago as 1913 Mr. Noel Pemberton Billing invented and, if we are not mistaken, patented an

instrument which could tell the pilot when he was at some predetermined height above the surface of the sea. It consisted of nothing more complicated than a small weight suspended on one end of a length of light cable. At its other end the cable was attached to a spring which was geared to the needle of the instrument. As soon as the weight touched the water the pull on the cable increased and the needle "kicked."

More recently, Jack Noakes, now a Wing Commander and stationed at No. 1 Flying Training School, Leuchars, carried out flying tests at the R.A.E., Farnborough, with a type of hanging stick which not only gave the pilot warning but actually operated the elevator control so as to make the machine flatten out. The Noakes stick never came into general use. On land its usefulness may have been rather restricted. But it would appear that on flying boats something of the same sort might with advantage be tried, experimentally at any rate.

## *All Mail by Air*

QUITE gradually, and with no great flourish of trumpets, all mail is becoming air mail. Last week it was announced that Belgium, France and Italy were now included in the scheme whereby letters and postcards stamped and posted in the ordinary way will be despatched each week-day by surface or air transport—whichever offers the quicker delivery.

This little notice from the P.M.G. means, in fact, that the whole of Europe (except Gibraltar, Malta, Portugal and Spain—to which no air services at present operate) is now included in the "all mail by air" plan. Denmark, Sweden, Norway, Finland and Estonia, those essentially progressive and civilised countries, were the first to start the scheme, while our own internal mail has been carried on such lines for more than two years. In due course the whole of the Empire mail will be carried by air at a flat rate.

The importance of this particular development as far as business people are concerned does not need to be stressed, but it should have even greater merit as a means of inspiring the more discerning members of the public with a belief in air transport and its economic stability. Flying now takes a normal place with other forms of transport as a method of carrying that most religiously safeguarded freight—His Majesty's Mail. The P.M.G. must necessarily be extremely conservative in his choice of transport methods, and the fact that aircraft are now on level terms with steamships, trains and native runners is distinctly encouraging.

Furthermore, while special labels, special stamping and special pillar-boxes have been necessary, the air mail business has involved too much trouble for the ordinary person. The matter is now being taken out of his hands—a letter is just posted.

## *De-Icing Devices*

THE recent Air Ministry Notice which sets out certain requirements to be included "in due course" in an Amendment List to A.P.1208 may be said to be lenient in so far as it makes compulsory the taking of a number of precautions which most aircraft operators have already adopted voluntarily. Precautions against ice formation on carburettor air intakes, tank vents and venturis are already taken by most operating firms.

Freezing of carburettors can be prevented by injecting a small quantity of alcohol. The prevention of formation of ice in the air intake is evidently visualised by the Air Ministry as being affected by tucking the mouth of the air intake inside, the actual wording being "an air intake sheltered from the direct ingress of rain and snow." Virtually the new regulation will make the fitting of flame traps compulsory, since otherwise the placing of the air intake inside might add very materially to the risk of fire.

Heating of venturis used for driving various instruments is offered as an alternative to the engine-driven vacuum pump. The new regulation will probably have the effect of popularising the latter method, which in any case, without the stimulus of the official airworthiness compulsion, has the advantage that the instruments driven by the pump begin to function even while the aircraft is stationary and can, therefore, be used during the actual take-off. This is, of course, important when the visibility at ground level is little better than zero.

Quite wisely, perhaps, the new regulations do not make compulsory the fitting of de-icers for wing and tail leading edges. Not only would this measure spell very considerable cost to the operator, but it may be argued that the perfect de-icer has not yet been discovered. That argument may be accepted, although a device which works seven times out of ten is surely better than none at all. And what about the fitting of slinger rings on the airscrew? The formation of ice on the blades will, by the vibration caused, compel the pilot to throttle right down and will thus lead to a forced landing just as much as the loss of power caused by the carburettor freezing or the air intake becoming choked with ice.

If it comes to that, prevention of icing of the pitot head is probably more important than all the others.

## *Homologated*

THE world's long-distance record without refuelling now definitely stands at 6,305.7 miles. The *Fédération Aeronautique Internationale* has homologated the flight from Moscow to St. Jacinto, California, on July 13-14-15, made by the three Russians Gromov, Yumashev and Danilin in an A.N.T.-25 monoplane fitted with an 860 h.p. AM-34 engine.

So that's that. In spite of anti-Soviet efforts to discredit the flight and to cast doubts on its bona fides, the F.A.I. has evidently satisfied itself that the three Russians did not make any intermediate landing. To suggest that the flight was "faked" always seemed to us an unsporting gesture, and we are glad that the F.A.I. has, once and for all, dispelled all doubt by homologating the record.

The next step should be for Great Britain to beat the really splendid Russian achievement. We can do it if we like to spend the time on preparations. But it is a matter requiring Air Ministry assistance. Men will have to be taken off urgent work in connection with the R.A.F. expansion. Still, the prestige of holding the world's long-distance record is worth the slight interference with the re-equipment of the R.A.F.

## *Moving On*

IN a world where delays and miscalculations are given so much more prominence than steady progress according to plan, it is pleasant to be able to watch the Empire air service scheme moving quietly on towards fulfilment. The new boats have come out from Rochester in a steady flow, two a month, the Atlantic survey flights have been carried on almost without a hitch and the boat service to Durban is now an accomplished fact.

And on Tuesday the first regular flying-boat service left Alexandria for Karachi—marking the initial stage in the reorganisation of the Australia route. For the moment only one of the two weekly services to India will be operated by flying boats, but eventually there will be five services in all—three by flying boat and two by landplane—and boats will be flown right through to Singapore and Sydney.

It would seem that the only likelihood of serious delay concerns the development of suitable bases in the Far East. Such bases cannot be made in a month or even in a year, so work should be started with as little delay as possible.

## *Italy's Manœuvres*

CAVALRY has been called "the arm of opportunity." As the functions of cavalry have now been largely taken over by the air arm, that term may now be justly transferred to the latter. In the recent manœuvres held by the Italian Army and Air Force in Sicily, experi-

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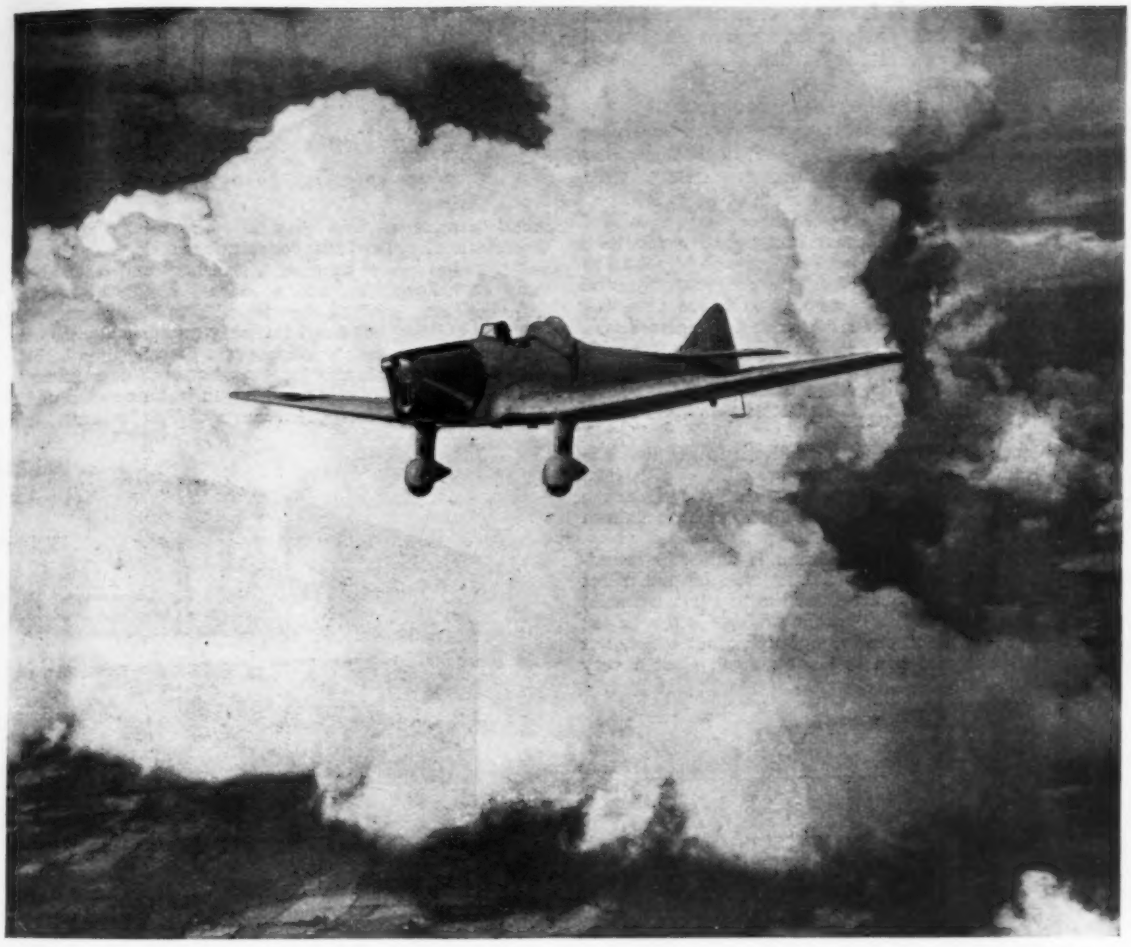


**MAJESTY AND MAGISTER : A production-type Miles Magister with Gipsy Major engine set against a background of the kind which is the *raison d'être* of the blind-flying "bonnet" over the rear cockpit. The Magister is really an improved Hawk Trainer.**

ments were made to test out various theories which had been elaborated by the staffs. From a semi-official source comes a brief summary of the conclusions arrived at with regard to the functions of the Italian Royal Air Force.

The manœuvres in Sicily took the form of a land campaign in which the main duty of the Air Force was to assist the Army. Naturally, the operations opened with air attacks on military objectives, mostly described as distant. Every student of warfare expects that air forces will come into action while the armies are first mobilising and then deploying, and during this phase there is sure to be a purely air campaign in which air attack and air defence will be opposed to each other. The Italian operations appear to have been normal in that respect. The writer of these conclusions emphasises that there was no need for the Air Force to mobilise in mass. The Air Force units worked from bases widely distributed, and sometimes covered as much as 900 kilometres (about 560 miles) on their flights to their objectives, which implies a range of over 1,100 miles. The writer justly shows pride in the range of the new machines with which, he says, the Italian Air Force is ordinarily equipped. One may remark, however, that operations in Sicily are not the same as war in a foreign country or in more distant parts of the Mediterranean.

The moral of this is obvious: if Italy wishes her Air Force to play an important part in Mediterranean politics, as she obviously does, long air endurance is a very important quality, and she must aim constantly at ever increasing the range of her bombers without unduly decreasing their bomb load. The same is true of other Mediterranean Powers, of which the most important are Britain and France. But though it is convenient not to move bases during operations in Sicily, air power depends largely on the number of bases available. Italy has shown her recognition of this principle by making an air base on the island of Pantellaria, in the narrowest part of the Mediterranean between Sicily and Tunisia, some 150 miles north-west of Malta. She already has bases in Rhodes and the Dodecanese islands. Britain, on the same principle, proposes to make a large air base in Cyprus.

## Co-operation

THE second phase of the operations was when the Armies had deployed and engaged. In that phase it is always necessary for the Air Forces to consider the needs of the Armies first, and only to attack such objectives as munition factories in the intervals between battles. The writer of these conclusions has little to say about this phase. That matters the less, for by then the air campaign has ceased to exist on its own account, and the air squadrons have become the modern versions of cavalry and long-range artillery—in fact, just arms of the Army. In the battles the aircraft seem to have qualified for the title "arm of opportunity." Moreover, unless the civil war in Spain, or some similar future conflagration, should develop into an open war between nations, extensive land campaigns are hardly to be expected in the Mediterranean area. Naval and air power are of much more importance in that part of the world, and consequently the conclusions drawn up by the Italian authorities are distinctly suggestive.

# MILAN E

## *Being an Account of a Flying a Fu 260 m.p.h. Bombers : Record-bre Tran*

ITALY'S great crusade for air records symbolises the renaissance of her aircraft industry. The world to-day is rapidly becoming Savoia, Cant, Breda and Macchi conscious.

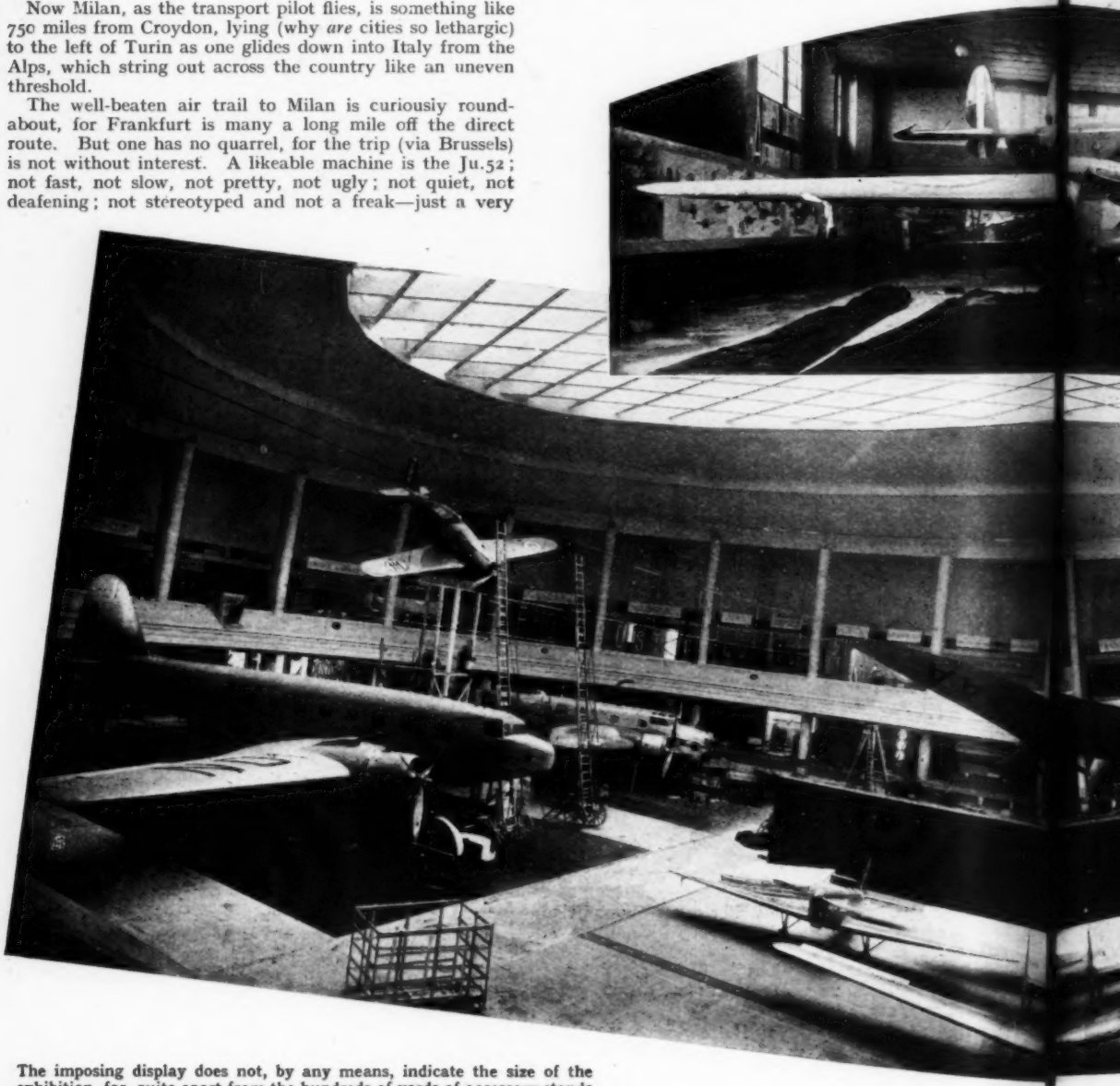
But there still remain those who doubt whether the brilliance of these weight-lifting, far- and fast-flying champions is reflected in Italy's standard products, for it is the quality of these which ultimately determines a country's place in the aircraft markets of the world.

Disregarding the gratuitous opinions of the unqualified dogmatisers (who have infested our industry for long enough) and equipped with a week-end case and a return to Milan, I settled into the "smoker" of a Frankfurt-bound Junkers determined to assess, as well as I was able, the virtues and shortcomings of Italy's newest aeroplanes and engines. A representative selection of these, together with some novelties from other countries, was to be shown at the Second International Aeronautical Salon (literal interpretation) then about to be staged at the Palazzo dello Sport, Milan.

Now Milan, as the transport pilot flies, is something like 750 miles from Croydon, lying (why *are* cities so lethargic) to the left of Turin as one glides down into Italy from the Alps, which string out across the country like an uneven threshold.

The well-beaten air trail to Milan is curiousiy roundabout, for Frankfurt is many a long mile off the direct route. But one has no quarrel, for the trip (via Brussels) is not without interest. A likeable machine is the Ju.52; not fast, not slow, not pretty, not ugly; not quiet, not deafening; not stereotyped and not a freak—just a very sound aeroplane. We growled purposefully along to Frankfurt, stopping for a coffee at Brussels, where Foxes and Fireflies were sunning themselves and thundering away at helicopterish angles under the urge of Kestrels and Hispanos. And so over the hills to Frankfurt.

It was curious, but I was intensely impressed by the fact that this magnificent aerodrome had literally been hacked out of dense forest; the "triumph of man over nature" line had not entered my mind for an instant as the world slid by under the corrugated wings of the Junkers.



**The imposing display does not, by any means, indicate the size of the exhibition, for, quite apart from the hundreds of yards of accessory stands there is another great hall of aircraft and engines. In the section shown may be descried three Fiats (left) and the German offering (right).**

# REVIEW

## *First-rate Aero Show : Italy's Transports*

By H. F. KING

The pause at Frankfurt gave kaleidoscopic views of the great Zeppelin hangar, a practical layout of offices in fine modern buildings, luggage-lorry drivers trying to emulate Caracciola, white fountains spurting before the airport beer garden, an array of Junkers, Heinkels, and Klemms, and the sturdy new Savoia which was to carry us over into Italy.

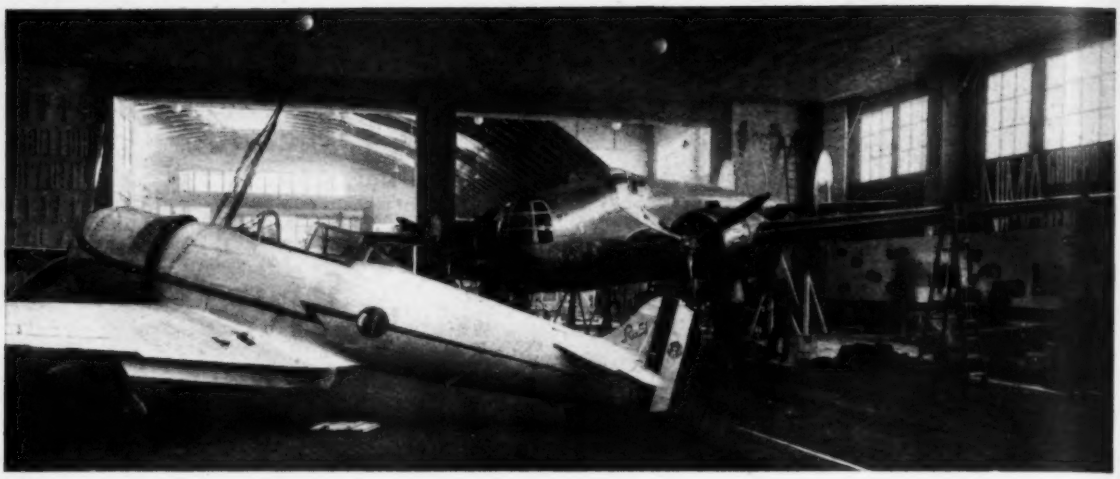
As one of the primary objects of the trip was to study Italian aircraft, a few words about this Savoia will not be out of place. It looked rugged (in the American sense) and had a most attractive interior smelling faintly of new upholstery. The engines were of the Alfa-built Pegasus type, fully supercharged for trans-Alpine work, and the undercarriage was fixed but well faired, comparatively narrow in track.

Fully laden, the take-off was not impressively short, in spite of the Hamilton-type airscrews, though we were up over the stump-pocked boundary with plenty of room to spare. The long haul up to the Alps was continuous climbing, and within half an hour the steward (quite incongruous in a soiled mechanic's uniform) was round with a bag of mouthpieces for the oxygen pipes, one for each seat.

Above fourteen thousand feet there was a general hibernation into blankets and overcoats, and eighteen little oxygen regulators clicked round. And so along up to what the steward vouchsafed was "sigs thousand maters." Cold, grey peaks once or twice pierced the cloud blanket, and at times there was a glimpse of seemingly bottomless chasms dropping down into the beauty which is Switzerland. Then things got quieter and warmer, and we slipped through the clouds over the murky Italian plain. There was a folding of blankets, a putting-on of hats; three throttle levers came back, and we whistled banking down over the flats of Milan, glimpsing the lake by the aerodrome which one day, when the new aerodrome beyond is ready, will be used for flying boat services.

Soon I was quite thawed out and ready for work. Through the courtesy of Signor Gustavo Montanaro, who spends his time arranging such affairs, I was able to gain access to the show before the official opening, which was scheduled to be performed by the Duke of Aosta and

**The unfriendly looking aeroplane in the central picture above is the Caproni Ca.135 bomber. The camouflage scheme is a multi-coloured one consisting mainly of red, grey, yellow and green.**



**The Romeo Ro. 51 fighter on the left is one of the few military models with a fixed undercarriage. Beyond is the Breda 82 bomber, which, the makers say, is as fast as a Blenheim.**

H.E. General Valle, Under-Secretary of State for Air. And let it be said that the exhibition is worthy of such illustrious patronage. For the benefit of the sensible people who intend to drop in for a day or two, the duration is October 2-11.

Now, the first thing one is expected to do at any aero show is to look for a keynote. The precise definition of a keynote is lost in the mists of olden-day journalism, but it is generally taken to be some manner of theme or trait. It is not to be confused with a trend, which is linear and not aural.

*Fortés, pièces de résistance,* and high-spots were there in abundance, but the keynote—yes, the keynote—was indubitably the high-speed bombers.

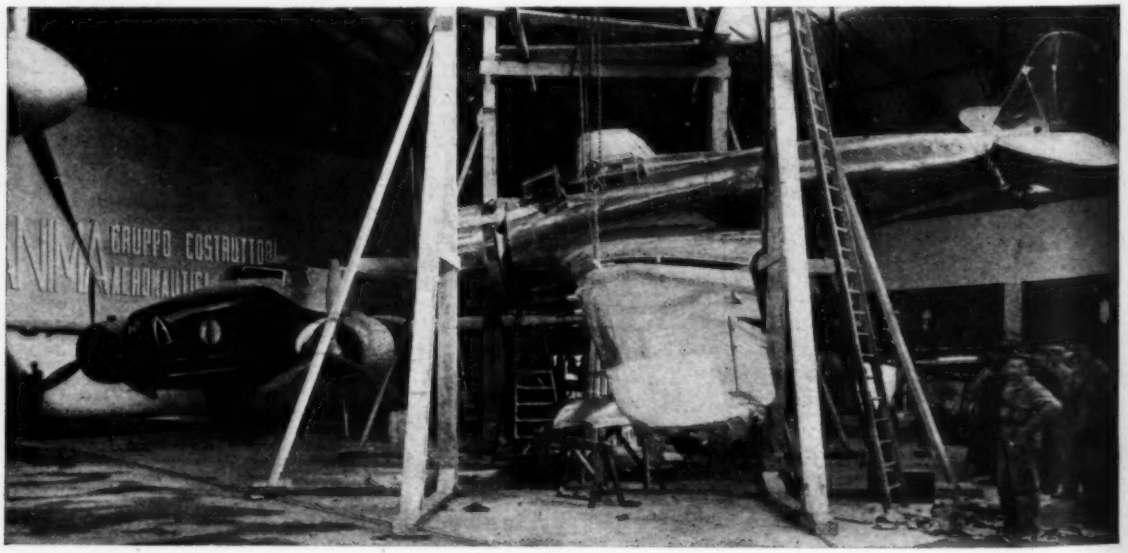
Caproni, Breda, Piaggio, Fiat, and Junkers all made contributions, but the first-named trio were the more interesting because they represented the " small-medium " formula as typified in this country by the Blenheim.

The Caproni effort, the Ca.135, is of Blenheim layout, though it has liquid-cooled Isotta-Fraschini XI R.C.40 vee-twelves giving a combined output of 1,800 h.p., or a little more power than the Blenheim's Mercurys. The disposable load (6,338 lb.) compares favourably with the Bristol's (4,621 lb.), but the top speed at 260 m.p.h. is 20 m.p.h. or more to the bad. The Ca.135 is said to land at 73 m.p.h. The example on view had a good deal of dummy equipment and windows, although (possibly because) it is in production as standard equipment for the Regia Aeronautica. There is a forward gun (the Blenheim's is fixed) which moves in a slit and must have a very restricted field of fire, and additional armament in retractable positions above and below the fuselage. With supplementary tanks and an unspecified bomb load the range is over 2,000 miles.

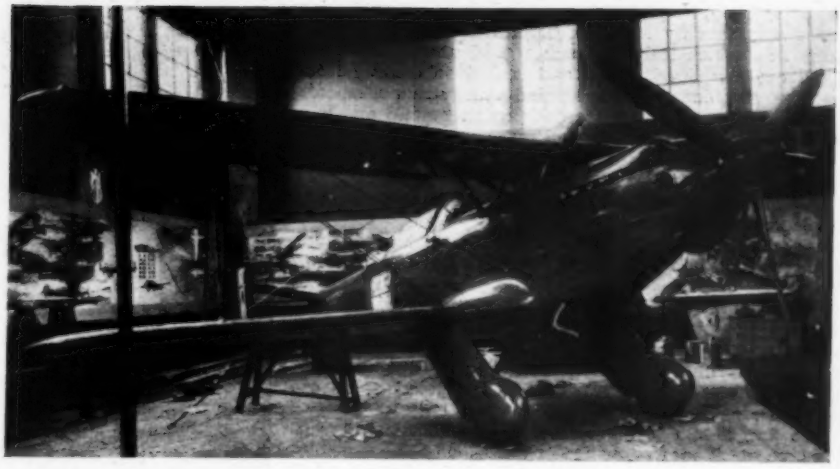
The twin rudders considering modern practice are very closely spaced.

The Breda bomber (type 82) has the following characteristics: Disposable load 7,500 lb., top speed 279 m.p.h. (this *does* seem faster than one might have guessed), and theoretical (a popular continental adjective) ceiling 31,000-odd feet.

Radials—1,000 h.p. Fiat A.80 RC 41 two-rows—are specified; these have flapped cowls and Hamilton-type airscrews. Features are ventral bomb stowage, twin rudders, slotted flaps and drooping ailerons. Without a doubt, the Breda 82 is a very offensive weapon.




**The Piaggio P.32 bomber (left) has a peculiar high-lift device permitting a strikingly short span. On the right the golden Breda 65 fighter-attack machine is caught taking off at a very tail-up attitude.**



**The Caproni Ca.134 is the latest word in Italian military biplanes. Intended for army co-operation, it has twin rudders, an outlandish undercarriage and a 900 h.p. Isotta.**

The Piaggio concern, of course, has ever tended toward the radical in aircraft design. How many people remember its huge four-engined trans-Atlantic monoplane which looked for all the world like an overgrown B.A. Double Eagle? I learned that this model is "still experimental" and so is the three-engined bomber which also had (perhaps, in view of the information, one should say has) Double-Eagle-like wings. In all fairness let it be said that the Piaggios were in the air before the B.A.s.

But to revert to the new twin-engined bomber. Labelled the P.32, it is characterised by a strikingly short span (59 ft.) which has been made possible by an ingenious high-lift device which is said to work very well. This is a double flap, but not of the variety which seems to interest some people in this country, i.e., the double-split variety. To put it simply, there are two flaps in tandem and both are lowered at appropriate angles to give a high-lift effect.

The stated disposable load of the P.32 is no less than 7,716 lb., and the top speed 260 m.p.h. with a brace of Piaggio P.XI RC 40s.

When the undercarriage is up there are very pronounced blister-like fairings beneath the nacelles which detract somewhat from a very clean and businesslike appearance.

The gun turrets (mounting a total of four weapons), like the flap system, are operated by compressed air.

It was whispered that eighty-five of these very formidable aeroplanes are already in service. Their flying characteristics should make a most absorbing study. Someone told me that they can manœuvre like small fighters because of their short span and high load factors.

The BR20 bomber was the prototype of the Fiat machines in the Damascus race, which, although they hit some rough luck, proved themselves very fast over long distances. Leading data are: Disposable load 7,936 lb. (the same, incidentally, as the Fiat G.18V transport, also exhibited). top speed 267 m.p.h., landing speed 75 m.p.h., and range 5,590 miles. This last is the manufacturer's figure, relating, undoubtedly, to the machine with supplementary tanks and in gross (decidedly) overload condition.

Two thousand horse-power is taken from the twin Fiat A.80 RC 41 two-row radials and delivered to constant-speed Hamilton-type airscrews.

The top-speed figure seems decidedly optimistic in view of the large, square-cut and somewhat humpy fuselage. Nose, ventral, and top-fuselage gun positions are included, and if the guns can be used effectively from their unobtrusive nests (and one must, of course, query the practical value of all free armament on machines doing over 250 m.p.h.) the BR 20 should be a very handy weapon to have around an air force.

## *Archaic Armament*

The Junkers Ju.86K (as supplied to Sweden) struck me as being a very sound bomber, but marred to a certain extent by archaic armament arrangements. The useful load is given at 6,460 lb., which seems low in comparison with the figures for comparable Italian types. Hornet-type engines, built by B.M.W.s, give a speed of well over 200 m.p.h., although it is not likely to be the 248 m.p.h. now claimed for the civil version of the Ju. 86.

Having heard some glowing reports about the Savoia S.79B bomber I was disappointed to find that its place had been taken at the exhibition by a transport machine. It seems that S.79Bs (these are twin-engined types, usually of about 2,000 h.p.) have been ordered as standard equipment by the Argentine, Rumanian and Iraqui Governments. A story was going the rounds that the Italian Government has earmarked some S.79Bs fitted with 1,400 h.p. Alfa Romeo engines from which 300-and-a-bit m.p.h. is expected, which is nice going if you can get the range.

It seems that during demonstrations before the Argentine Government someone questioned the manœuvrability of the S.79B, so it was looped four or five times just to show that there was no ill-feeling. It weighs over 21,000 lb.

A bomber-reconnaissance

**A particularly welcome exhibit is the Heinkel He. 112 fighter, a diminutive projectile which does about 300 m.p.h. carrying two Oerlikon "cannons" and a pair of machine guns. The engine is an inverted -vee Junkers Jumo 210 Ea of 685 (max.) h.p.**

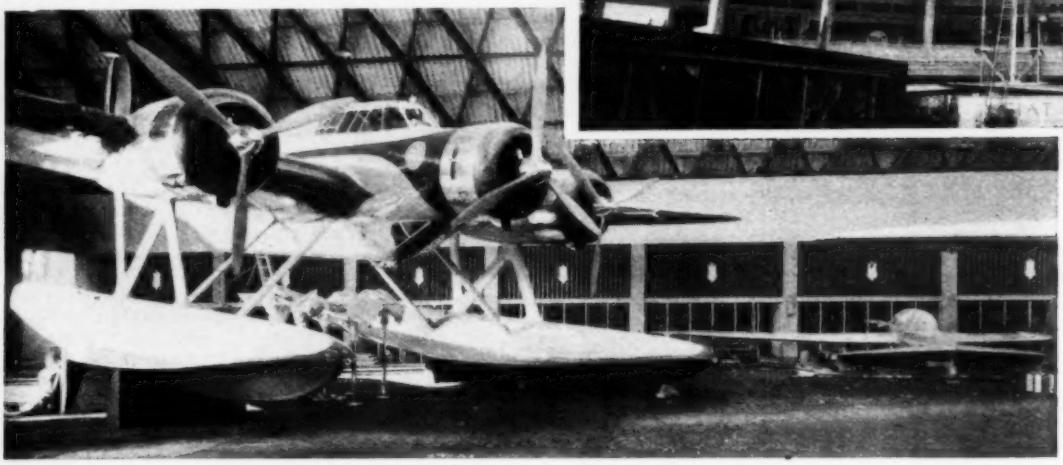
floatplane by Cant (Cantieri Riuniti dell 'Adriatico) and a new flying boat by Macchi represented the large marine aircraft for which Italy has such a good name. The Cant is quite a new development and is derived directly from the Z.506 machine, which has added a nice string of records to Italy's tally. It bears the designation Z.506B and is a three-engined type (Alfa-built Pegasus) with a fine slim fuselage incorporating the fashionable ventral bomb stowage. I gathered that the armament arrangements are purely tentative, and that it is unlikely that an order will be placed by the Italian Government.

Apparently the conversions of the big Cant floatplanes of this layout into landplanes have not been unqualified successes.

The Cant people claim as one of the great advantages of large floatplanes that the machines can be kept in service with a pair of spare floats, which can be fitted without disturbing the passenger cabin, as might be necessary with a central-hull flying boat during periods of inspection and renovation.

The firm is still toying with its experimental landplane bomber, the Z.1011.

Macchi's flying boat, the M.C.99, is obviously descended from the twin-engined amphibians operated by Ala Littoria in the Mediterranean. It carries its two liquid-cooled Isottas above the wing and has large flared-out chines, which look a bit old-fashioned. The bombs are stowed in the wings,



**The somewhat nebulous military Cant triple-engined floatplane. Armament stowage is quite arbitrary at the moment, but the machine will certainly have a good performance. Beyond it is the incredible SS3, concocted at Guidonia.**

and at about twelve one night I happened to be prowling in the vicinity while adjustments were being made in the bomb-cells. I was politely requested to look the other way while the nice flying boat was *en négligé*.

Tests of the M.C.99 are still proceeding, but estimated figures are: Top speed 177 m.p.h., range 4,000-odd miles (presumably with no military load), disposable load 10,580 lb., full-load take-off in 36 sec. (confirmed), and ceiling 17,000 ft.

There are twin machine guns in the bow turret, one in the centre of the hull, and another pair in the stern. The mountings are power-driven.

I was given to understand that three samples have been ordered by the Italian Government. On suggesting that the outrigger mounting of the engines was rather unfortunate aerodynamically I was reminded that the M.C.99 was conceived by the man who designed the fastest aeroplane in the world.

Macchis are building a three-engined commercial boat to do 200 or more m.p.h.

Frankly, I was a bit disappointed in the Italian fighters, but perhaps I have been spoiled by Spitfires, Hurricanes and the rest. Nevertheless, it seems that the Italians take their Fiat G.50 very seriously, for it was released for exhibition only provided it was hung up from the ceiling where prying eyes would miss important details.

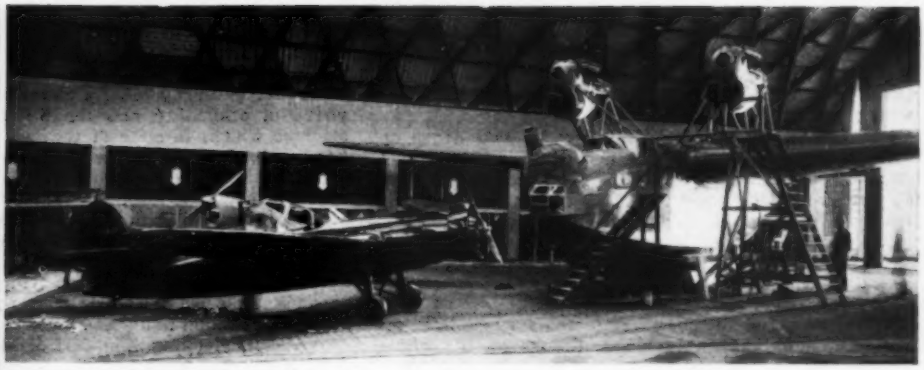
The G.50 is certainly a "different" aeroplane as fighters go these days. It uses a two-row 840 h.p. Fiat A.74 RC38 which has a flapped cowl with troughs for a pair of machine guns. There seems to be no wing armament. What use a two-gun fighter will be is rather difficult to see.

There are flaps, of course, and the ailerons are of unusually high aspect ratio. The good forward-downward view which might have been obtained from the cockpit must be marred by the shape of the centre-section, the leading edge of which juts forward. There is, in fact, a general increase in the size of the wing in that region which is arranged to receive the retractable wheels.

Manufacturers' data for the G.50 are: Useful load 950 lb., top speed 290 m.p.h., and landing speed 73 m.p.h.

The Romano people have a pair of fighters, one the little Ro.41 gull-winged, rigidly-braced biplane as used by the Regia Aeronautica for aerobatic training, and the second the comparatively new Ro.51 monoplane, with the same engine as the aforementioned Fiat and similar armament. The undercarriage is fixed and the vertical tail surfaces shockingly small. I was informed that the type has already been ordered by the Government. Although it is probably quite a sound aeroplane, I was not very impressed by its potentialities as an up-to-date weapon.

A type which did thrill me, however, was the tiny Junkers Ju.112, which made its debut at Zurich the other



**The projection of so much rear armament on the Junkers Ju. 86K bomber is deplorable aesthetically and aerodynamically. The "dustbin" would be more at home in a museum than on such a fine bombing machine.**

**In the foreground of the right-hand view is the little S.A.I.3 two-seater with the S.A.I.2 cabin machine beyond. The flying boat is the new Macchi MC 99 bomber-reconnaissance machine with a pair of Isotta Assos of 750 h.p. each.**

week. Rather like a shrunken He.70, this little single-seater has a Junkers Jumo 210 inverted vee and has for its stock-in-trade two synchronised machine guns and a pair of wing-mounted Oerlikon "cannons." The undercarriage folds up laterally, and when the wheels are down there is very little of the lower surface left intact.

Internal stowage for light bombs set me thinking about anti-aircraft bombs as religiously advocated by Mr. Golovine. The cooling flap for the radiator (using water and not glycol) is hydraulically controlled. Figures for the He.112 are: Useful load 1,388 lb., top speed 295-300 m.p.h., and range 475 miles.

Perhaps the most strikingly displayed exhibit was the familiar Henschel fighter-dive bomber, complete with projectile load and camouflage, "banking" round the hall which houses the German exhibits.

A cursory glance at the Breda 65 fighter gave the impression that Italian manufacturers are working in beaten gold instead of duralumin. Shown *monoposto*, with four staggered wing guns, this type can be supplied as an attack machine or two-seater fighter. It does 250-odd m.p.h.

A twin-engined Caproni military trainer of nearly 800 h.p. gave me a mild jolt. We shall soon have trainers to teach people to fly trainers. Known as the Ca.310 the machine in question is destined for functions similar to those of our Airspeed Oxford.

Caproni has also weighed in with a rather intriguing reconnaissance (or army co-op.) biplane which has twin rudders and a carefully faired undercarriage with its roots in the lower main planes. The 900 h.p. of a liquid-cooled Isotta moves it at over 240 m.p.h., which is handy when one is trying to give enemy fighters the slip.

So much for the out-and-out destroyers and their satellites. Having cleared the air of them, let us consider the transports, trainers and the inevitable flotsam and jetsam.

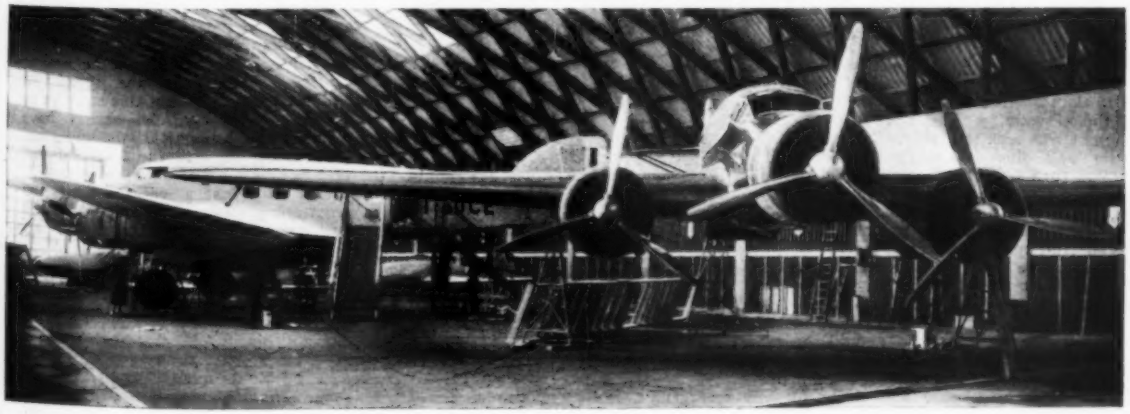
Fastest of the liners is the Savoia Marchetti S.83, a ten-passenger model derived from the S.79 series, an example of which (actually "I-11," the Damascus race victor) is displayed alongside. Factors contributing to its aerodynamic and commercial efficiency are interconnected slots and flaps, retractable undercarriage (an advance over our trans-Alpine vehicle) and ventral baggage stowage.

## *That Third Engine*

I have always marvelled at the efficiency Savoias get with their three-engined types in spite of the fact that the nose engine, so they say, does about half the work of the wing units. For commercial work, however, they like that extra bit of safety it affords.

Examples of the new S.83 have been ordered by Sabena and Rumanian and Italian concerns. It is said to be good for 267 m.p.h. using fully supercharged Alfa-Bristols and the disposable load is 7,700 lb.

The Damascus race machine near-by has a little trap-door in the floor through which I glimpsed the tanks which, at racing speeds, must literally decant petrol to the triple Alfa-built Pegasae. These, by the way, are not fitted with gilled cowlings



**The Savoia Marchetta S.79 (three Alfa-built Pegasus) on the right is "I-11," the winner of the Damascus race. It is one of the most arresting machines on show, in its red and green paint. In the background is the new Savoia S.83 transport developed from the S.79 design. This is said to be good for nearly 270 m.p.h.**

I was rather taken by the new version of the Fiat G.18, a Douglasian monoplane now graced with two Fiat 80 RC 41 two-row engines which confer a top speed of nearly 250 m.p.h. With its constant-speed airscrews this machine seems a very useful type for certain classes of work. Its load is 7,930 lb.

Of similar power (480 h.p. supplied by two Argus or Hirth engines) the Ago Kurier and Halle FK.104 light transports or rich man's tourers represent the latest German practice in the construction of comparatively small "twins." With top speeds of the order of 200 m.p.h. they should be excellent propositions for feeder line work. The Kurier is the more striking of the two, with its sharp dihedral on the outer wing panels and its wide retractable undercarriage.

The small civil trainers and tourers exhibit no momentous aerodynamic advances, though on the whole they are not so stereotyped as the military machines. There is the Whitney Straight demonstrator, ferried out by Mr Gordon Marshall (still there is nothing in its class quite as good as "Straight"), the Messerschmitt Taifun and a single-seater Tipsy with a roof. The original idea was, I gathered, to show the two-seater Tipsy but this, having flown over the Alps, came down rather heavily at Milan and was in no fit condition to be shown. A Whirlwind-Stinson was promised, but had not arrived while I was in Milan.

The Gotha works are presenting a new high-speed single-seater, with Argus As 10C engine and a speed of about 213 m.p.h., which is rather disappointing in view of the fact that it has about 40 h.p. more than a Mew Gull.

I was attracted particularly by the Breda 79S four-seater high-wing tourer with a speed range from 47 to 160 m.p.h. and interconnected slots and flaps. The version on view has the German Argus engine in place of the Alfa formerly fitted.

The Arado Ar.96 high-performance trainer should, perhaps, have been dealt with as a military model for special emphasis has been lain on its aerobatic qualities. It does 186 m.p.h. with the 240 h.p. Argus and bears quite a striking resemblance to the latest German fighters.

The Nardi Brothers, who specialise in light tourers and trainers for people who like a bit more speed than is usually demanded, are putting up their 200 m.p.h. F.N.305 fighter-trainer (Alfa Romeo or Walter), and the two-seater touring version of the same design. These types are quite well known by now, but the Nardis have other shots in their locker, notably the F.N. four-seater tourer with 200 h.p. Fiat engine.

The Societa Aeronautica Italiana display their little two-seater mid-wing S.A.I.3 tourer which at least has the virtue of originality and the S.A.I.2S four-seater cabin machine which, in spite of the fact that it has only 186 horses, should do more than the 130 m.p.h. which is published for it.

The dainty little Magni Vale must have gained for Italy a record in a special category—for appearing at more aero shows than any other aeroplane, despite the fact that, to the best of my knowledge, few, if any, have ever been sold. For those interested in this not unappealing single-seater sport trainer it does 155 m.p.h. with a 130 h.p. Farina radial in a special Magni cowling.

A delicate-looking Zlin XII light monoplane with 45 h.p. Persy has been brought over from Czechoslovakia. Its designer seems to have done quite well with the power at his disposal for it will do about 100 m.p.h.

### *Flaunting Convention*

Of course, there are the machines which, justly or unjustly, are called freaks. The less freakish one of the pair on view—the Lombardi light pusher monoplane—seems to be a somewhat crude attempt to carry on the Hammond Y theme. The engine is a 110 h.p. Alfa and there are two seats. The second, and much more bizarre effort, is the SS3 device, conceived at Guidonia, which worthy establishment, according to some unqualified observers, should have known better. The designer was Eng. Sacchi, who has put his surfaces and power plant in such positions as to make it a matter of some difficulty to judge if the SS3 is flying ahead, astern or crab fashion. But there may be quite a good deal in this tail-first pusher.

Of the accessory and incidental exhibits I have space to say nothing here except that the whole display, particularly that by the Italian Regia Aeronautica, was superb.

One noticed among British names the following: Automotive Products, Arthur Balfour, Blanchard Machine Co., Broom and Wade, Cambridge Instrument Co., Cooke Troughton and Simms, Negretti and Zambra, Smith's Aircraft Instruments, G. B. Stone, Super Oil Seals, Thos. Firth and John Brown, Vacuum Oil Co., and Vickers Armstrong, Ltd.

(*Concluded on page 363*).

# ROBERT JOHN WAIGHT

IT is with deep regret that we record the death, in a flying accident on October 1, of Mr. R. J. Waight, the senior test pilot of the De Havilland Aircraft Company. When the accident occurred he was making a circuit of the aerodrome at Hatfield in the little T.K.4 preparatory to a practice run around the course which he was to use for an attack on the 100 km. class record.

Until all the evidence has been carefully sifted it will be impossible to do more than make a surmise at the cause of the tragedy. The fact that the machine was seen to "ripple" momentarily and then to make a steeply banked turn towards the large field in which it crashed, suggests that Mr. Waight was doing all he could, in the few seconds available, to prepare for a forced landing, and an examination of the wreckage and of the machine's track marks tended to bear this out. It will be some small consolation to those who knew him well to think that, in the last few seconds, he should be quickly and calmly preparing to save the machine. Mercifully, death must have come instantaneously.

Always imperturbable and ready for any emergency, Bob Waight was everything that a test pilot should be, and he had a knowledge of the machines and engines in his charge which enabled him to fly always with his brain as well as with the inborn manual skill of the true pilot. His essential imperturbability could not be more adequately shown than on the occasion when, through some refuelling miscalculation, all four engines of an 86 faded out over Epping or thereabouts, and he forced-landed the machine on Broxbourne aerodrome. So normal and unexciting was the approach that a radio expert, who had been working on the equipment, stepped straight out and walked away to fetch some other spanner which he required—thinking that he was at Hatfield again. It was typical of Waight that, in telling this story to us a few weeks ago, he should have stressed the humour of the radio expert's surprise, and the fact that fuel had to be bought, for once, "outside," rather than that a very difficult and frightening forced landing approach had been successfully carried out.

His considerable knowledge was the result not only of long training, but of a real interest in his job. Born on October 4, 1909, he was apprenticed to the D.H. Company in May, 1928, obtaining his "A" and "C" G.E.'s licences in March, 1931. He started to fly early in 1932, obtained his "A" licence within a month and his "B" licence in December, 1933. His logbook showed a total of about 2,150 hours, and he was appointed chief test pilot to the company just two years ago.

*Flight* offers its sincere sympathy to his wife and daughter and to the De Havilland Company in their loss.

# THE FOUR WINDS

## ITEMS OF INTEREST FROM ALL QUARTERS

**FEIGNED FLIGHT : With four of the new 830 h.p. Bramo 323 J. Fafnir engines, Lufthausa's new 26-seater Focke-Wulf 200 (Condor), will have a speed of 230 m.p.h. This cleverly faked picture of a model shows the Condor's businesslike appearance.**

THE Short and Harland factory at Belfast will soon be in production with the Bristol Bombay and the Handley Page Hampden.

The Royal Aero Club has received notification from the F.A.I. of the homologation of the long-distance record put up by the three Russians, Gromov, Yumashev and Danilin, on July 13-15.

It will be remembered that they flew the A.N.T.25 monoplane over the Arctic from Moscow to San Jacinto, U.S.A. The official distance is given as 10,148 km. (6,305 miles).

The Russian semi-rigid airship, V6, is claimed to have made a record duration flight without refuelling. The previous record of 119 hours, set up by the *Graf Zeppelin* in 1935, was bettered by 11 hrs.

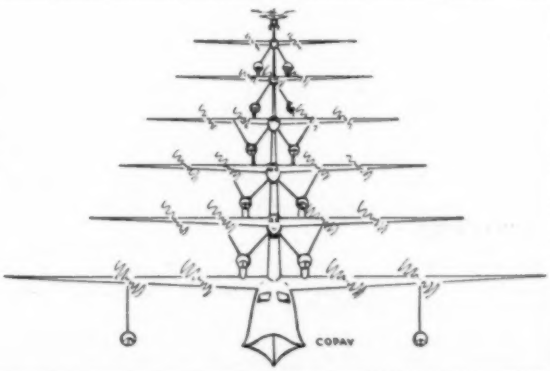
Have travellers in Herne Hill noticed that two adjacent roads are named respectively Rolls Court Avenue and Kestrel Avenue?

Two Monospars destined for use in parachute training in Turkey left Hanworth on Sunday morning. They represent a repeat order from the Turkish Air League and are being flown out by Messrs. R. H. Somerset and L. Castlemaine.

General Milch, German Under-Secretary for Air, was received by M. Cot, French Air Minister, at Le Bourget military aerodrome on Monday evening with full military honours. An official visit will be paid to the Paris Exhibition. Major-General Ernst Udet piloted the machine from Germany.

**THE UNKIND UNTRUTH**

*(with apologies in all directions)*




**No. 7. Short Poux-du-Chien**

### *Twenty-five Years Ago*

(From *Flight*, October 5, 1912.)

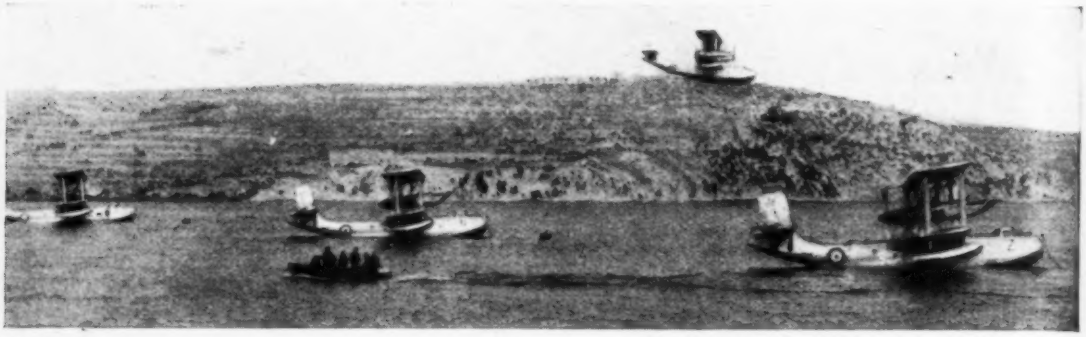
"Shortly after 9 o'clock Marcel Desoutter took out the Gordon Bennett 50 h.p. Gnome-Bleriot, which was fitted with a head and a tail lamp *and* a Klaxon horn. . . . The sixpenny and shilling enclosures went wild with delight as he passed over them tooting away on this well-known road clearer. . . . Sydney Pickles then essayed a trip on the 35 h.p. Anzani-Caudron biplane—brilliantly lit up—but was prevented from rising more than about ten feet by the formation of ice in and around his carburettor."—(From a report of one of the Hendon night-flying meetings.)

The first of sixteen Fokker T.5 heavy bombers with Bristol Pegasus XX engines has been inspected by Dutch military authorities who ordered the machines. The T.5 has an ingenious tail turret of conical formation similar to that on *Le Faucher*. The top speed should be about 230 m.p.h. at operational height.

Russia has acquired the licence for the Consolidated PBY-1 flying boat as used by the U.S. Navy, and the Vultee attack bomber. The big Martin flying boat ordered by the Soviet (a development of the Pan-American Clipper type) is being assembled in the open air at Baltimore. This has four 850 h.p. Wright Cyclone G engines.

# THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS



**PIRATES BEWARE! No. 209 (G.R.) Squadron arriving at Malta from Felixstowe on September 19. The Squadron has been taking part in anti-piracy patrols**

## AIR MINISTRY APPOINTMENTS

The Air Ministry announces the following appointments:—

Mr. A. H. Self, Principal Assistant Secretary, to be Deputy Secretary (additional) as from October 1.

Mr. C. G. Evans and Mr. W. L. Scott, D.S.C., to be Principal Assistant Secretaries as from December 2, vice Mr. J. A. Webster, C.B., D.S.O., and Mr. J. M. Spaight, C.B., C.B.E., who retire on that date.

## VOLUNTEER RESERVE SCHOOLS

One of the new R.A.F. Volunteer Reserve flying schools opened at Barton, Manchester, on October 1. It is operated by Airworks, Ltd., and the chief flying instructor is F/O. S. J. H. Carr.

Similar schools were opened on the same day at Gravesend and Gatwick aerodromes. A dozen pupils, who have been sworn in as sergeant pilots, have arrived at Gatwick and a few more at Gravesend.

## No. 4 FLYING TRAINING SCHOOL

The undermentioned airman has been awarded a special assessment on completion of a course of flying training at No. 4 Flying Training School, Abu Sueir:—

*Distinguished Pass*

A./Sgt. Sweeting, R. H.

## No. 6 (AUXILIARY) GROUP

Nos. 33/34, Tavistock Place, the headquarters of No. 6 (Auxiliary) Group and No. 30 (Balloon Barrage) Group, will be re-numbered No. 11, Tavistock Place, as from January 1, 1938.

## NO TROUBLE AT ADEN

The Air Ministry announces:—With reference to the report that has appeared in the Press to the effect that a British officer and four R.A.F. men have been killed in action against tribesmen in Aden the Air Ministry has received a categorical denial of the report from the Air Officer Commanding, Royal Air Force, Aden. No officers or airmen have been killed and the situation in Aden and the surrounding territory is normal. The further report that reinforcements are being sent to Aden is also unfounded.

## EXTENSIONS OF SERVICE

The undermentioned officers have been selected for retention on the active list as indicated:—

MEDIUM SERVICE OFFICERS—SERVICE TO BE EXTENDED TO COMPLETE ELEVEN YEARS

Sqn. Ldr. John Fisher Fosbroke Pain and Flt. Lt. Gerald Price Marvin.

SHORT SERVICE OFFICERS—SERVICE TO BE EXTENDED TO COMPLETE SEVEN YEARS

Flt. Lts. Igor William Braye, Geoffrey James Ian Clennell, Augustine Stuart Quallett Robins, James Horatio Gratwick Sarll; F/Os Peter Hiley Dutton and James Robert Gillman.

## MOVE OF No. 55 (BOMBER) SQUADRON

No. 55 (Bomber) Squadron closed down at Hinaidi on September 11 and reopened at Dhibban on September 14.

## No. 7 ARMAMENT TRAINING CAMP—FORMATION

No. 7 Armament Training Camp will open at Acklington, Morpeth, Northumberland, on December 1, on which date it will be placed in the Training Command in the Armament Group. The range at Druridge Bay will be available for use on January 1, 1938.

## ROYAL AIR FORCE EDUCATIONAL SERVICE

The annual general meeting of the Royal Air Force Education Officers' Association will be held in the Hotel Great Central, Marylebone, on Friday, October 15, commencing at 2 p.m.

The annual dinner will be held at the same place at 7 p.m. for 7.30 p.m. Mr. W. M. Page, C.B.E., M.A., Director of Educational Services, will be in the chair. Particulars may be obtained from the dinner secretary, Captain W. J. O. Studd, A.I.Mar.E., Air Armament School, Eastchurch, Sheerness, Kent.

## OCTOBER PROMOTIONS

The undermentioned promotions are made with effect from October 1, 1937:—

*General Duties Branch*

*Squadron Leaders to be Wing Commanders.*—P. M. McSwiny, C. F. Chinery, J. A. Boret, M.C., A.F.C., T. A. Warne-Browne, D.S.C., C. W. Busk, M.C., A.F.C., H. H. Down, A.F.C., G. G. Banting, G. V. Howard, D.F.C., C. F. Le Poer Trench, R. L. Crofton, M.B.E., A.F.C., W. J. Daddo-Langlois, E. H. Richardson, G. H. Harrison, D.F.C., J. Oliver, A.F.C., F. C. B. Saville, A. M. Wray, M.C., D.F.C., A.F.C., G. D. Daly, D.F.C., L. G. Harvey, C. N. Ellen, D.F.C., A. P. Davidson, H. W. Heslop, O.B.E., J. L. M. De Cosigny Hughes-Chamberlain, A. L. A. Perry-Keene, W. A. B. Bowen-Buscarlet, D.F.C., K. E. Ward, E. T. Carpenter, A.F.C.

*Flight Lieutenants to be Squadron Leaders.*—D. L. Evans, M.C., D.F.C., J. Marsden, V. H. Clift, G. P. Macdonald, W. L. Freebody, P. M. Watt, J. A. P. Harrison, H. A. Purvis, D. J. Waghorn, J. D. F. Bruce, U. D. Morsehead, W. N. Blain, J. F. X. McKenna, V. B. J. Jackson, A. McKee, S. O. Bufton, J. V. Yonge, S. R. Ubee, B. A. J. Crummy, R. W. M. Clark, D.F.C., G. A. G. Johnston, J. R. Scarlett, W. G. H. Ewing, P. Kinsey, R. J. Cooper, C. C. O'Grady, L. P. Moore, H. H. Martin, H. P. Fraser, A.F.C., M. C. Collins, S. R. Groom, E. M. F. Grundy, W. J. Crisham.

*Equipment Branch*

*Flight Lieutenants to be Squadron Leaders.*—A. T. Wells, G. L. Worthington, D. A. W. Sugden, F. A. R. Smith, H. Seidenberg, C. W. Gore.

*Accountant Branch*

*Flight Lieutenants to be Squadron Leaders.*—A. E. West, R. G. D. Thomas, R. G. Dyer, M. H. Luker, R. T. Carter, S. C. Wyatt.

## ENGINE AND TORPEDO SPECIALISTS

The undermentioned officers, having successfully completed the specialist "E" course at Henlow, which terminated in July, are granted the symbol "E":—

Flt. Lts. P. Bathurst, G. L. Best, C. N. Carpenter, J. H. A. Chapman, R. Faville, W. L. Houlbrook, J. M. D. Ker, E. R. Pearce, A. Pyke, N. C. S. Rutter, A. A. Saw, R. G. Shaw, F. E. Stokes.

The undermentioned officer also successfully completed the abovementioned course:—

Flt. Lt. D. H. MacCaul, Royal Canadian Air Force.

The following officers have been selected to attend advanced courses at the Imperial College of Science and Technology and at Cambridge University, commencing in October:—

*Imperial College of Science and Technology*

Flt. Lts. P. Bathurst and E. R. Pearce.

*Cambridge University*

Flt. Lt. F. E. Stokes.

The undermentioned officers were selected to attend the Torpedo Course on H.M.S. *Vernon* which commenced on September 6:—

Flt. Lts. R. Faville and R. G. Shaw.

## EXPLOSIVES COURSE

The undermentioned officers having successfully completed the Explosives Course held at No. 2 Equipment (Ammunition) Depot, Altrincham, which terminated on August 7, are granted the symbol "X":—

Flt. Lts. L. F. Oldridge, E. J. H. Starling, C. P. Wingfield; F/O.s E. G. Ambridge, L. C. Dennis, C. F. Harrington.

## FLYING ACCIDENTS

The Air Ministry regrets to announce the following accidents:—

L.A/C. Edwin Pepall Jeffrey lost his life in an accident which occurred at Sealand, Chester, on September 29 to an aircraft of No. 5 Flying Training School, Sealand, Chester. He was the pilot and sole occupant of the aircraft.

Sgt. Arthur Clifton Reginald Wood, A/C.1 Robert Pull and A/C.2 Brinley Thomas South lost their lives as the result of a collision in the air which occurred at North Weald on September 30 between two aircraft of No. 29 (Fighter) Squadron, North Weald.

Sgt. Wood was the pilot of one aircraft and A/C.2 South was a passenger. A/C.1 Pull was a passenger of the other aircraft, the pilot of which, P/O. Leon Maxwell-Muller, was not injured.

Sgt. John Hubert Williams lost his life in an accident which occurred near Wyton on October 1 to an aircraft of No. 139 (Bomber) Squadron, Wyton, Huntingdon. He was the pilot and sole occupant of the aircraft.

# ROYAL AIR FORCE GAZETTE

*London Gazette, September 21, 1937*

The following are granted short service commissions as Acting Pilot Officers on probation with effect from and with seniority of September 5:—W. D. Adams, A. M. L. Alderton, H. C. Bailey, D. G. Baker, A. R. Ball, D. M. Barker, A. L. V. Barnes, A. J. Blackwell, P. McC. Bond, E. W. Brown, J. Browning, W. J. Burnett, P. R. Burton-Gyles, P. J. A. Byers, A. Q. Cairns, L. S. Campbell, G. P. Christie, J. K. Collins, G. L. Cooper, S. T. Cooper, R. M. Coste, A. F. Crosby, R. P. Y. Cross, P. F. McD. Davies, L. C. Deane, A. C. Dier, T. K. G. Dudley, W. C. Duncan, D. McK. Edmondson, N. H. Elliot, L. E. Ellis, L. H. Eno, W. R. Farnes, S. M. Farries, H. M. Ferriss, R. F. Finch, W. H. Flint, L. H. Folkard, E. C. Fyson, F. B. Gabb, D. E. Garland, W. H. George, A. D. Gosman, W. N. Gray, J. Hamlyn, W. J. Harper, J. M. Hayward, K. J. Henderson, D. S. G. Honor, T. M. Horgan, D. W. S. Howroyd, M. L. Hulton-Harrop, A. S. Johnston, C. E. Jones, D. A. E. Jones, F. T. Knight, E. B. Lancaster, M. G. Lewis, S. M. de L. Longsdon, L. A. Lynn, D. C. McKinley, A. S. Mann, A. D. J. Martin, J. L. Mayfield, R. M. Milne, F. A. Morant, G. B. Morgan-Dean, E. J. Morris, A. J. Oettle, T. H. V. Pheloung, K. A. Porter, J. A. Pritchard, T. P. Pugh, R. M. S. Rayner, A. W. H. Reader, A. C. Roberts, D. S. Robertson, A. M. Ross, B. Ruffell, C. A. Rust, J. R. Saunders, W. H. Shaw, G. C. Shepherd, S. L. Sigurdson, G. W. Slee, I. J. Spencer, A. C. Stewart, W. H. Stratton, D. M. Taylor, E. N. Taylor, W. G. Taylor, M. W. H. Uphill, D. H. Wardlaw, E. F. P. Wheller, R. B. Whittington, H. C. G. Wilcox, D. W. T. Withers, G. Wright, R. A. Yates-Earl.

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—R. A. I. Harrison (seniority May 28) (August 28); P. A. McWhannell (September 3); R. G. Prier (September 16).

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—H. D. Cooke, R. C. Waddell, J. C. McG. Lunn, J. E. Jacobs, D. Davies, G. J. Bush (August 16); A. D. C. Fair, C. S. Darwood, M. S. Bocquet (September 15).

Wing Cdr. R. H. M. S. Saundby, M.C., D.F.C., A.F.C., is granted the acting rank of Group Captain (unpaid) while employed at the Air Ministry (September 18); F/O. R. J. C. Nedwill is granted the acting rank of Flight Lieutenant (September 16); F/O. (Acting Flt. Lt.) E. L. Colbeck-Welch relinquishes the acting rank of Flight Lieutenant (August 22); Flt. Lt. S. P. A. Patmore is placed on the half-pay list, Scale A, from August 23 to September 12 inclusive; Acting Pilot Officer on probation H. A. Ostler resigns his short service commission (September 11); Acting Pilot Officer on probation J. N. A. Buckmaster relinquishes his short service commission on account of ill-health (September 1); the short service commission of Acting Pilot Officer on probation A. R. R. Gifford is terminated on cessation of duty (July 22).

*Equipment Branch*

The following Pilot Officers on probation are confirmed in their appointments and promoted to the rank of Flying Officer (August 28):—F. G. Carle, F. B. King.

The following Flying Officers are promoted to the rank of Flight Lieutenant (September 1):—C. H. Baker, M.B.E., P. S. Stewart, R. E. P. Paynter, D.C.M., C. W. Goodchild, M.B.E.

*Medical Branch*

R. M. Hewat, M.R.C.S., L.R.C.P., is granted a short service commission as a Flying Officer for three years on the active list with effect from and with seniority of August 14, and is seconded for duty at St. Mary's Hospital.

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—G. B. MacGibbon, M.B., Ch.B., D. F. S. Shaw, M.B., Ch.B. (seniority September 7, 1936) (September 7); C. C. Barker, M.B., Ch.B. (seniority November 5, 1936) (September 7); C. E. G. Wickham, M.B., B.S., M.R.C.S., L.R.C.P. (seniority March 29) (September 10).

Wing Cdr. H. S. C. Starkey, O.B.E., M.D., B.C., M.R.C.S., L.R.C.P., D.P.H., is placed on the retired list (September 16).

*Dental Branch*

R. H. Matthews, L.D.S., is granted a non-permanent commission as a Flying Officer for three years on the active list with effect from May 29, 1933, and with seniority of January 29, 1933. (Substituted for notification in *Gazette* of June 27, 1933); F. C. W. Rudd, L.D.S., is granted a non-permanent commission as a Flying Officer for three years on the active list with effect from and with seniority of September 1, and is seconded for duty at the Liverpool Dental Hospital; F/O. R. H. Matthews, L.D.S., is promoted to the rank of Flight Lieutenant, with effect from May 29, 1935, and with seniority of January 29, 1935. (Substituted for notification in *Gazette* of May 28, 1935.)

*Chaplains Branch*

The Rev. F. W. E. Wagner is granted a short service commission with the relative rank of Squadron Leader, with effect from and with seniority of September 10.

*Commissioned Signals Officer*

W/O. E. Gough is granted a permanent commission as Flying Officer on probation with effect from September 4, and with seniority of August 30.

*Erratum*

In the *Gazette* of July 27. For Jackson Sidney Brett read Jackson Sydney Brett.

## ROYAL AIR FORCE RESERVE

*Reserve of Air Force Officers*
*General Duties Branch*

Lt.-Col. E. Gillespie, D.S.O. (R.M. Ret.), is granted a commission as Flight Lieutenant in Class C (July 1); Sqn. Ldr. W. W. Hart, M.B.E. (R.A.F. Ret.) is granted a commission as Flight Lieutenant (Hon. Squadron Leader) in Class C (July 16); Lt. L. J. Fox (R.N. Ret.) is granted a commission as Flight Lieutenant in Class C (August 14).

The following Flying Officers are granted the honorary rank of Flight Lieutenant with effect from the dates stated:—A. M. Butt (August 3); E. M. Morris (August 15).

F/O. W. R. Tope relinquishes his commission on completion of service (December 30, 1936); F/O. A. M. Lester relinquishes his commission on completion of service and is permitted to retain his rank (July 28).

*Equipment Branch*

The following Flight Lieutenants are promoted to the rank of Squadron Leader (September 3):—E. P. Hardman, D.F.C., D. W. King.

## AUXILIARY AIR FORCE

*General Duties Branch*

No. 601 (COUNTY OF LONDON) (FIGHTER) SQUADRON.—H. J. Riddle is granted a commission as Pilot Officer (July 31).

No. 607 (COUNTY OF DURHAM) (FIGHTER) SQUADRON.—M. H. B. Thompson is granted a commission as Pilot Officer (August 17).

No. 615 (COUNTY OF SURREY) (ARMY CO-OPERATION) SQUADRON.—L. T. W. Thornley is granted a commission as Pilot Officer (August 21).

*Medical Branch*

No. 615 (COUNTY OF SURREY) (ARMY CO-OPERATION) SQUADRON.—T. Crowley, M.B., Ch.B., is granted a commission as Flying Officer (August 23).

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*General Duties Branch*

The following Flight Lieutenants are granted permanent commissions in that rank on the dates stated:—H. R. Allen, G. E. Macdonald (July 2); P. Bathurst, C. N. Carpenter, W. L. Houlbrook, A. A. Saw (July 27).

The following are granted temporary commissions as Flying Officers on being seconded for duty with the R.A.F. (September

13):—Lt. F. M. Benito (The Prince of Wales's Volunteers), Lt. A. D. Bryant (The Royal Northumberland Fusiliers), Lt. R. S. Layborne (Welsh Guards); Lt. W. R. Clapham (The Manchester Regt.), Lt. P. Legge (Royal Artillery), Lt. E. J. M. Lang (The Sherwood Foresters); Sec. Lt. P. A. Hawks (The King's Regt.).

The following Acting Pilot Officers on probation are confirmed in their appointments and graded as Pilot Officers, on the dates stated:—K. B. T. Burns (August 7); T. H. T. Forshaw (August 17); J. A. L. Fowler, G. H. B. Hutchinson, E. D. J. R. Leddiard Whatley (September 4).

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—J. B. P. Thomas, J. C. Norhey (September 3); P. H. Dutton, E. H. P. Clarke, G. P. Seymour-Price (September 24).

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—R. N. Wardell, L. E. Cryer, A. de V. Leach, N. A. N. Bray, E. H. T. Thwaites, A. J. Trumble, J. Vivian, R. L. Smith, J. R. Wilson (September 15); F. W. Flood, G. E. Horne, H. D. Newman, V. Ray (September 21).

Acting Pilot Officer on probation D. S. Thom is graded as Pilot Officer on probation (September 4).

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated:—C. L. Gomm (August 7); J. M. Thompson (September 16).

The following Flying Officers relinquish the acting rank of Flight Lieutenant on the dates stated:—C. F. Sarsby (August 7); F. J. Manning (August 16); D. N. J. P. Leggett, K. J. McKay (August 29).

Flt. Lt. D. W. Baird is transferred to the Reserve, Class A (September 12); Sqn. Ldr. J. G. S. Candy, D.F.C., is placed on the retired list at his own request (September 12) (Substituted for the notification in the *Gazette* of September 17); Lt.-Cdr. C. A. N. Hooper, R.N., Sqn. Ldr., R.A.F., relinquishes his temporary commission on return to Naval duty (August 20); Lt. G. B. Kingdon, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on return to Naval duty (September 14); P/O. N. G. C. Heath is dismissed the service by sentence of General Court Martial (September 20).

*Medical Branch*

The following are granted short service commissions as Flying Officers for three years on the active list with effect from September 6, and with seniority of the dates stated:—R. L. Scott, M.B., Ch.B. (September 6, 1936); N. Mackenzie, M.B., Ch.B., (October 9, 1936); B. G. Haynes, M.B., B.S., F. G. Ryan, L.R.C.P. and S. (September 6).

*Dental Branch*

The following are granted non-permanent commissions as Flying Officers for three years on the active list with effect from and with seniority of September 6:—G. W. Hargreaves, L.D.S., N. L. Newman, B.D.S.

*Chaplains Branch*

The Rev. F. E. H. Trevor is granted a short service commission with the relative rank of Squadron Leader with effect from and with seniority of September 15.

*Memorandum*

The permission granted to G. P. Scammell to retain the rank of Lieutenant is withdrawn on his conviction by the Civil Power (September 9).

*Erratum*

In the *Gazette* of September 17 *for* George Joseph Parsons *read* George Joseph Edward Parsons.

## ROYAL AIR FORCE RESERVE

*Reserve of Air Force Officers*
*General Duties Branch*

G. Terrell is granted a commission as Flying Officer in Class A with effect from September 14 and with seniority of May 19, 1931; N. R. Harben is granted a commission as Flying Officer in Class A with effect from September 21 and with seniority of November 6, 1936; F/O. R. H. Rose is granted a commission in that rank in Class A with effect from September 21 and with seniority of September 21, 1926; P. A. R. Bremridge is granted a commission as Flying Officer in Class A with effect from September 28 and with seniority of March 28, 1936; P/O. E. Sprawson is promoted to the rank of Flying Officer (February 13, 1936).

The following Flying Officers are transferred from Class A to Class C on the dates stated:—K. Maconochie (July 19); L. E. Chiswell (August 10).

F/O. T. B. Fenwick is transferred from Class A to Class C from July 9, 1936, to September 9, inclusive.

The following Flying Officers relinquish their commissions on completion of service on the dates stated:—L. H. Ross (September 15, 1936); E. A. Williams (July 29); C. Ray (September 14).

## ROYAL AIR FORCE VOLUNTEER RESERVE

*General Duties Branch*

The following are granted commissions as Pilot Officers on the dates stated:—J. A. De Laszlo (September 21); C. M. Wight-Boycott (September 28).

## AUXILIARY AIR FORCE

*General Duties Branch*

No. 6 (Co. of Aberdeen) (A.C.) Squadron.—A. M. Scott is granted a commission as Pilot Officer (July 30).

## AUXILIARY AIR FORCE RESERVE OF OFFICERS

Flt. Lt. G. C. Bonner is transferred from Class A to Class C on extension of service (September 1).

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

*General Duties Branch*

*Wing Commander.*—C. Turner, A.F.C., to Headquarters, Bomber Command, Uxbridge; for Equipment (Engineer) Staff duties, 13.9.37.

*Squadron Leaders.*—H. H. Down, A.F.C., to No. 1 Flying Training School, Leuchars; for duty as Chief Flying Instructor, 10.9.37. S. E. Storrar, to Directorate of Organisation, Air Ministry, 6.9.37. D. M. Fleming, to No. 25 (Fighter) Squadron, Hawkinge; to command, 10.9.37. A. C. Evans-Evans, to Headquarters, No. 6 (Auxiliary) Group, London; for Signals duties, 6.9.37.

*Flight Lieutenants.*—D. W. Lane, to Armament Training Camp, Leuchars, 13.9.37. A. F. R. Bennett, H. M. T. Eversfield, N. C. Jones, J. G. Munro, E. J. Palmer, R. G. Watson, and G. P. Woodhouse, to Air Armament School, Eastchurch, 29.8.37.

*Flying Officers.*—G. D. Garvin, to No. 5 Flying Training School, Sealand, 26.8.37. J. A. Chorlton, to No. 24 (Communication) Squadron, Hendon, 20.8.37. D. N. J. P. Leggett, K. J. McKay, and W. A. Theed, to Air Armament School, Eastchurch, 29.8.37.

*Pilot Officers.*—T. M. Evans and N. B. Mole, to R.A.F. Station, Manston, 22.8.37. D. I. McLeod, to No. 24 (Communication) Squadron, Hendon, 17.8.37. P. S. Weaver, to No. 56 (Fighter) Squadron, North Weald, 13.9.37.

*Equipment Branch*

*Squadron Leader.*—F. D. D. Gaussen, to R.A.F. Station, Halton; for Equipment (Supplies) duties, 20.9.37.

*Flying Officers.*—The undermentioned are posted to Equipment Training School on appointment to permanent commissions, on probation, with effect from 4.9.37:—E. J. Adams, H. J. Bartlett, F. E. Bastin, D. L. Eden, E. G. Edmonds, H. Gedd, A. H. Gee, F. P. Gee, F. J. Gracey, R. H. Harvey, E. R. Hoare, D. Holbrook, C. J. Hutton, J. E. Linford, L. A. McIntosh, McD. B. Manson, H. C. Manuel, J. K. Osborne, I. E. Phillips, R. D. Robinson, D.C.M., L. S. Rutley, G. W. Salt, C. Stonebridge, M. J. Sullivan, T. C. Wharfe, L. G. Wheeler, A. E. White, and W. P. Williams, A.F.M.

*Medical Branch*

*Squadron Leader.*—J. Mac.C. Kilpatrick, to Special Duty List; for duty at Chemical Defence Experimental Station, Porton, 15.9.37.

*Flight Lieutenant.*—I. Mackay, to R.A.F. Institute of Pathology and Tropical Medicine, Halton, 15.9.37.

*Flying Officers.*—The undermentioned are posted to Medical Training Depot, Halton, on appointment to short service commissions with effect from 6.9.37. B. G. Haynes, N. Mackenzie, F. G. Ryan, and R. L. Scott.

*Dental Branch*

*Flying Officers.*—The undermentioned are posted to Medical Training Depot, Halton, on appointment to non-permanent commissions with effect from 6.9.37:—G. W. Hargreaves and N. L. Newman.

*Commissioned Engineer Officers*

*Flight Lieutenants.*—J. T. Brown and J. E. Atkins, to Headquarters Training Command, Market Drayton, 1.9.37.

*Flying Officers.*—The undermentioned are posted to the units shown on appointment to permanent commissions on probation with effect from the dates indicated:—H. Cooper, to Home Aircraft Depot, Henlow, 23.8.37. S. Mather, to No. 3 School of Technical Training (Men), Manston, 23.8.37. H. Furner, to Headquarters, No. 24 (Training) Group, Halton, 23.8.37. G. M. Mackie, to Home Aircraft Depot, Henlow, 23.8.37. T. L. Thomas, to No. 1 School of Technical Training (Apprentices), Halton, 23.8.37. J. W. Dunk, M.B.E., to Reception Depot, West Drayton, 30.8.37. W. Lodge and W. Jenkins, to No. 1 School of Technical Training (Apprentices), Halton, 30.8.37. F. W. Henwood, to School of Naval Co-operation, Lee-on-the-Solent, 30.8.37. E. Salter, to R.A.F. Station, Driffield, 30.8.37. H. Barnes, to R.A.F. Station, Cranfield, 30.8.37. F. Wall, to R.A.F. Station, Upper Heyford, 30.8.37.

*Commissioned Signals Officers*

*Flying Officers.*—The undermentioned are posted to the units shown on appointment to permanent commissions on probation with effect from 30.8.37:—H. W. Smith, to R.A.F. Station, Leconfield. J. F. Hall, to R.A.F. Station, Debden. A. Kemsley, D.S.M., to R.A.F. Station, Duxford. S. E. Catt, to R.A.F. Station, Kenley. J. Farmer, to R.A.F. Station, Dishforth. E. Gough, to R.A.F. Station, Amman, Transjordan.

*Commissioned Armament Officers*

*Flying Officers.*—The undermentioned are posted to the units shown on appointment to permanent commissions on probation with effect from 16.8.37:—F. R. Clay, M.B.E., to Aeroplane and Armament Experimental Establishment, Martlesham Heath. W. Robinson, to R.A.F. Station, Waddington.

*Chaplains Branch*

Revd. H. Thomas, B.A., to Headquarters, R.A.F., Middle East, Cairo; for duty as Chaplain (C. of E.), 11.9.37. Revd. W. P. Hughes, to R.A.F. Station, Cranwell; for duty as Chaplain (C. of E.), 1.9.37.

# HALF-PINT RACERS

## —and Some Others : What Goes Into the Building of the "One-place Ships" That Compete in Such Events as the U.S. National Air Races

By ROBERT C. MORRISON

*IT has always been difficult to obtain reliable information on the constructional details of the odd little projectiles, often home made, which American pilots fly in such events as the U.S. National Air Races (reported in* Flight *of September 23). In this article an American describes in characteristic style some of the machines, home-built and otherwise, which took part in this year's event. Taken by and large, constructional methods show the oddest mixture of sound ideas, worthy of adoption by factories, and the out-and-out Heath Robinson*

WE might borrow Barnum's slogan, "The Greatest Show on Earth," and apply it more adequately to Cliff and Phil Henderson's wonderful spectacle, the National Air Races. It is an annual event in which the more noted pilots of America and a few from abroad display their skill and daring in a manner that would put the ancient chariot races of Rome to shame. This year the races were held at Cleveland's enormous new airport on September 3-6. All sorts of stunts, manœuvres by the Army, Navy and Marines, hundreds of parachute jumps, together with a variety of other novel events, made this year's races the best ever.

The most interesting, however, were the high-speed events, of which two or three were held each day, and it is my belief that nowhere in the world has such a varied assortment of specially built racing planes competed together at one time. Last year the National Air Races were rather handicapped in the number of ships when ten special racing airplanes cracked up just prior to and during the races. This year only three met a dismal fate, leaving a total of seventeen racing jobs to churn up the air, as well as two standard commercial planes that also did very well. It is these planes and the new products of American manufacturers that made their first public appearance at the Races that will form the substance of this article.

Many years ago aeronautical engineers looked to the racing plane as the forerunner of commercial and military aircraft. They had hoped to gain more knowledge of how to build faster airplanes, but to-day designers can get along splendidly without the aid of racing planes, and for that reason the National Air Races have lost their main purpose of being a proving ground for future aircraft and are now more or less an amusement centre working on a large scale, and also a show place for America's aviation progress during the past year.

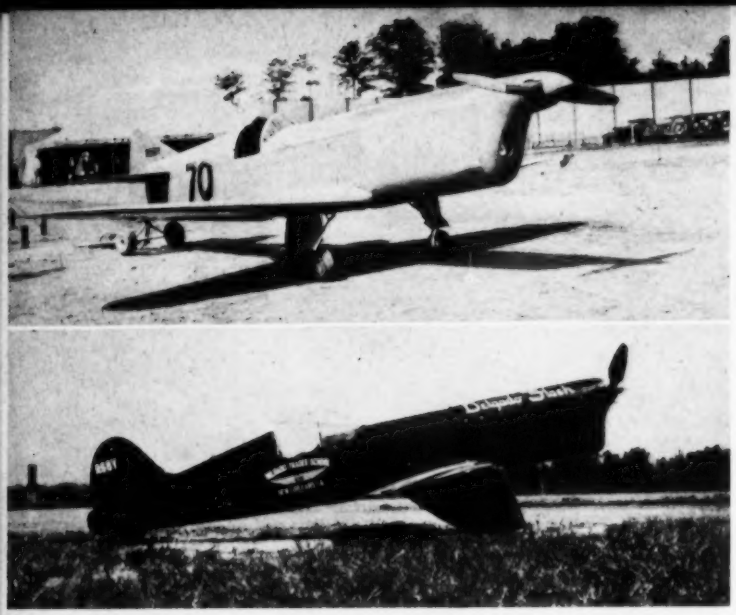
### Development

It might be well to state here, however, that some American sport planes have been developed from racers, namely, the Brown monoplane with Handley Page slots, and Benny Howard's very successful four-place cabin monoplane developed from his *Mr. Mulligan*. This year Mr. Eiler Sundorph completed a new sport plane that competed in the Bendix Los Angeles-New York race; this might also be classed as a racer. This ship is a high-wing monoplane with very smooth lines. Its fuselage is all metal in construction with the outside metal skin taking all the stresses on the fuselage. There are no stringers whatsoever, and the only internal structure is a series of "U"-section forming rings that hold the fuselage's monocoque shape. It was necessary to use thick metal covering in order to carry all the loads, and for that reason it was possible to use flush rivets and to give the ship a very smooth surface. Obviously this type of construction is very easy to build and is now very popular in the United States.

**The American picture agency's caption to this U.S. National Air Races photograph is worthy of quotation in full: "Marines paint backdrop to Air Races. Marine planes (above) streak across the sky at the National Air Races in Cleveland in one of a series of maneuvers by pilots of the nation's armed forces. Army, Marine and Navy fliers at the races threatened a 'strike' for a time for $5 a day expense money, ice water and better hotel accommodations. The strike threat dissolved when the demands were met by air race officials."**

The wing of the Sundorph is fabric-covered. It appears to be of the conventional wooden construction and is mounted on what vaguely resembles the turret structures that carry the wings on the old Martin and Sikorsky Clipper ships. In this structure is located the four-place cabin which held a huge extra fuel tank for the Bendix race. The tail is unique in design and, like the wing, is full cantilever. The fin and stabiliser are metal-covered from the leading edge to a point halfway aft, and from then on they are fabric covered. The fin fairs for some length along the top of the fuselage into the rear of the cabin structure. A Jacobs L-5 engine of about 268 h.p. powers the plane and gives it a speed of over 200 m.p.h. with full load. A special Lycoming engine was used for the race. The very clean cantilever landing gear does not retract. There is a general tendency to fit non-retracting undercarriages and to use streamline wheels.

In the many years I have watched the flights of high-speed specially-built racing planes (which flights have now totalled more than three hundred) I have never seen a wing flutter on a single ship until this year. Flutter was once one of the racer's worst enemies, and it is gratifying that it has been overcome so completely. It was the Sundorph racer that developed flutter this year as it made a power dive across the field after finishing the Bendix race. It had been carrying an overload of fuel and the high-speed dash had caused the wing to develop a very violent flutter from root to tip—the first ever experienced by the airplane. The flaps and ailerons made the trailing edge very flexible, and as the pilot nosed the ship upwards, thinking it was the engine that caused the vibrations, the flutter tapered off slowly to the tips, and for some time later the left aileron kept flapping in the breeze; but miraculously no part of the airplane broke away from its moorings and a safe landing was effected.



C. H. Gotch's Keith-Rider Special (top) and the Delgado, both of which have small Menasco in-line engines. The Delgado, built by students, is comparable with our T.K.4.

The second place winner of both the Thompson and Bendix races was Earl Ortman's re-vamped Keith Rider. This plane was originally built for the MacRobertson Race, but on one of its trial flights it nosed over, killing its pilot, Jim Granger, and since then has been rebuilt twice. A two-row Pratt and Whitney Twin Wasp Junior now powers the craft, and had not Ortman gone into a coma from the oil fumes and high altitude he might have easily won the Bendix Race. Though this plane is a long-distance ship it was entered in closed-course competition and did very well considering. When the tail of the all-metal fuselage is filled to capacity with oil it takes about seven men to lift it, the ship being so heavy. Forward of the cockpit enclosure are tanks holding 240 gallons, which is just about enough for a speedy flight of 3,000 miles from Los Angeles to New York. Howard Hughes used only 200 gal. on his seven-hour flight for that distance. That is, of course, a very low fuel consumption for such a large engine (also a Twin Wasp Junior) but at lower altitudes in closed-course racing where the engine does not produce its maximum output and is not in rarefied air the story is different. However, the Keith Rider clocked 263 m.p.h. in its qualifying race for the Thompson Trophy Race and had plenty of fuel for the 200-mile grind.

## *Speed-polishing*

The wing and tail surfaces of the Rider, except for metal fin, are wood with plywood covering, over which is silk material to give a very smooth surface. The entire plane is painted black, and at times, as on many of the racers, the leading edge of the wing is gone over with emery paper to get the maximum of smoothness from the paint job and thus a few more miles per hour. On all the racing ships skin friction drag has been well taken care of by the use of well streamlined shiny surfaces.

The Ortman plane broke precedent by having a flapped cowl, which is a very helpful device for racers. Their engines are usually driven full out all the time, so, obviously, cooling is one of the most important items in the design of modern racing craft. The engines are very temperamental, and a cooling device that may be adjusted in the air as desired may mean the difference of the losing or winning of a race.

Col. Roscoe Turner, after much difficulty in preventing his new sleek racer from blowing apart at the various stopping points on the way to the Races, finally arrived on the last day after a mad speed dash averaging 333 m.p.h. from Albuquerque to Cleveland. Apparently his engine trouble had been overcome! While Ortman had a low-wing racer, Col Turner's was of the mid-wing variety with a surface so smooth that it was impossible to discern its construction. However, without any possibility of doubt, it is plywood-covered with a sheet-metal leading edge. The fuselage is a wood-and-metal-framed structure covered exceedingly well with fabric. Up in front is a 1,200 h.p. Pratt and Whitney T in Wasp engine turning a three-bladed propeller. One of the most surprising features is that it has a fixed landing gear. Turner's craft is the ultimate in streamlining and is slightly faster than Ortman's steed.

The speed demon of the Races, however, was Steve Wittman, who turned the laws of aerodynamics upside down when he flew his two old racers like they had never been flown before to break all sorts of speed records and beat everything in the field. His old Curtiss D-12-powered racer was the fastest plane at the meet. It is not a racer with a bullet-like appearance, but has an odd shape with a fuselage of simple steel-tube construction and a very thin wire-braced wooden two-spar wing, fabric-covered. This ship was placed second in the Thompson Trophy Race two years ago, and at that time it had a Ford automobile leaf spring across the belly of the fuselage, to which the main landing gear was attached and acted splendidly as a shock absorber. However, the plane turned into a large "barn fire" on its way out to participate in the 1936 Races and was completely rebuilt this year. This time the entire landing gear consists of one solid piece of sheet metal about $\frac{3}{4}$in. thick bent down from the fuselage with a small wheel on each end. Though simple and inexpensive, it makes a good landing gear with excellent shock-absorbing qualities. Its weight also, perhaps, serves as a keel for the ship! And certainly nothing could be better for perfect streamlining. Another very novel feature of the plane is the large prop spinner, inside which is a series of blades forming a fan to blow air into the radiator, which has the same diameter as the spinner. In the nose of the spinner is a hole to let in air.

This Wittman creation was the only water-cooled airplane present on the entire airport. The mid-wing is very thin and its chord is almost as long as its span. There is no taper whatsoever except slightly at the tip in front elevation, the tip being chopped off, as in the old Farman airplanes. The plane was designed and built by Wittman himself and the workmanship is excellent. When it is in the air it is the smoothest-running plane of them all. In qualifying for the Thompson Race it averaged 276 m.p.h. for two laps around four pylons.

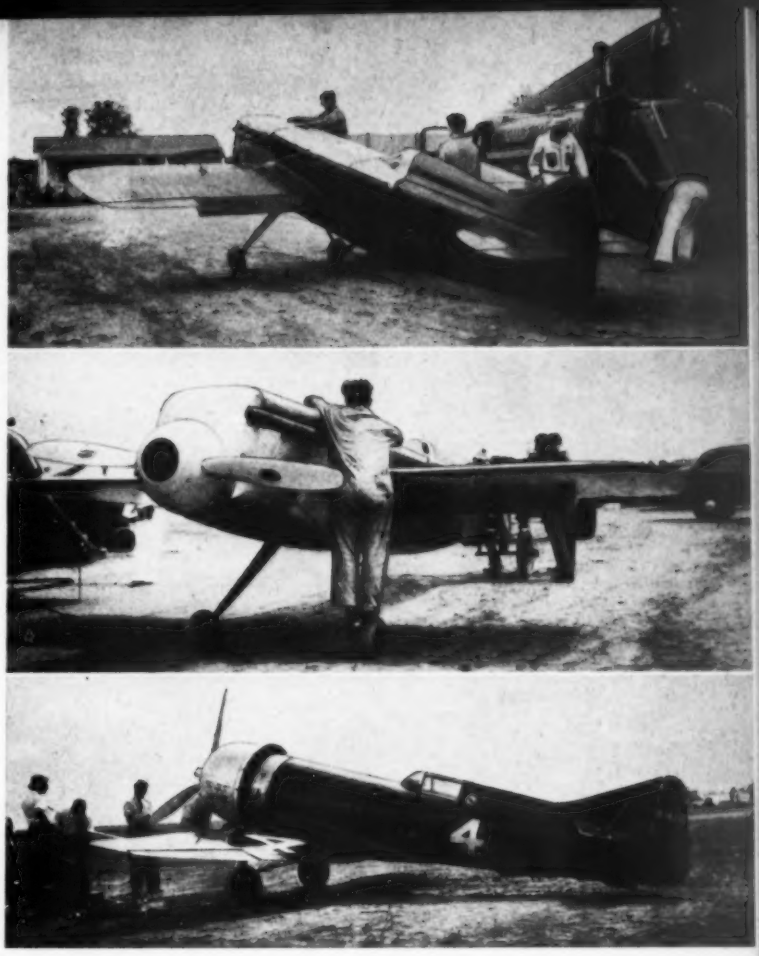
## A *"Back-yard" Undercarriage*

Wittman's smaller ship was an exact replica of his other one except that it had an inverted in-line Menasco C-4-S engine of 363 cu. in. displacement (his other is 1,145 cu. in.), and this, too, beat everything in its class. The chief quality that gave these planes so much speed was undoubtedly their light weight and a dare-devil at the controls.

Wittman's smaller ship also has leaf springs for the landing gear. These, however, project down from the fuselage to the wheels, and one day, while making a forced landing, they tangled with the antenna on a Northrop attack ship and remained with the Northrop as the remainder of the airplane skidded along on its belly. Nowadays the plane has a sheet-steel landing gear which was undoubtedly put on in Wittman's spare time in his back yard. The planes are certainly money-makers for Wittman, and he deserves much credit for having such confidence in his own original ideas.

The U.S. Army Air Corps was represented unofficially in the racing programme by two Seversky low-wing ships that are very much like the Seversky pursuits being delivered to the Army now. One was the original pursuit demonstrator developed by Seversky and now owned by William Zelcer, of New York. It was flown by Seversky's chief test pilot, Frank Sinclair, and was the faster of the two in closed-course racing. However, Frank Fuller, in the other Seversky, was much the

Art Goeble's Boeing 100 sky-writer.



**Two views of the Wittman-Curtiss racer, the only water-cooled machine at the races; in one event it averaged 276 m.p.h. for two laps round four pylons. Below it is Earl Ortman's Keith Rider (Twin Wasp Junior), originally built for the MacRobertson race, and twice rebuilt since. It has tankage for 3,000 miles.**

faster when it came to flying at high altitudes in the Bendix Race, winning the 3,000-mile event with an average speed of 257 m.p.h., including one stop on the way. Fuller's racer was built as a pursuit airplane and then was stripped down for racing purposes, which included cutting down the pilot's enclosure, installing an extra fuel tank, and, of course, eliminating all armament.

The Seversky's design is now more or less the property of the Government, but there is probably no secret innovation. They are of all-metal construction and, like nearly all new aircraft of this sort, have no integral fuel tank, the fuel being carried in the structure of the wing itself. Twin Wasp engines are used, and their small frontal area permits good streamlining.

In the United States much attention has been given the English military planes with their Vee-type engines which have given them such smooth lines, and at last the U.S. has an Allison Vee-12 engine in the same horsepower class as the Rolls-Royce Merlin. Seversky and Curtiss are putting them in new pursuits, as are many other manufacturers, but the radial engine still dominates, as the Curtiss company plans to install a new 1,400 h.p. Twin Hornet in one of their single-place pursuits.

The Races were a good opportunity to observe the manœuvring qualities of these new pursuit creations. Unlike the large racers that flew the "great circle" route around the pylons, the Seversky's were so manœuvrable that they were able to hug the pylons like the smaller craft without losing very much speed. They flew about fifty feet from the ground except when trees forced them to slightly higher altitudes. The large racers were flown always banked, as they made a perfect circle of the ten-mile course, while the smaller ships made power dives from pylon to pylon and banked and climbed steeply around each pylon. It was on one of these turns that Lee Miles lost his life at the Races. Apparently a cross-wire on the landing gear of his five-year-old Miles-Atwood racer snapped. With that type of bracing, and at such a speed as that at which Lee was flying, the whole plane falls apart if a wire snaps. Both wings flew off at almost the same time and hit the tail, crumpling into a dozen or more pieces which looked like paper as they floated in the air. Lee did not have time to cut the switch and the engine kept running full out for some time. With no wings the fuselage spun around, and this evidently killed Lee Miles before the fuselage plunged to earth as the engine quit.

The smaller racing planes ranged from 150 to 250 h.p., and all had Menasco inverted in-line four- and six-cylinder engines. There was one exception, and that was the Wittenbeck Special, with a small Cirrus engine that was just fast enough to "cop" last-place money. The older planes had wooden wire-braced wings and steel-tube fuselages, all fabric-covered. The newer little speedsters have full cantilever monospar wooden wings with plywood covering and retractable landing gears which snap up in two or three seconds. The fuselages are still mostly of steel tube covered with fabric, except the Delgado Trades School *Flash*, which was all-wood and entirely plywood "dressed." The strength, lightness and good surfacing qualities have made plywood very popular among racing plane builders. The surface is usually covered with silk, which assists in eliminating any viscosity.

## *Clipped Wings*

The Folkerts racers, of which there are two, are the best performing among the smaller race jobs. Roger Don Rae had one with a four-cylinder 150 h.p. Menasco in its nose, and Rudy Kling (winner of both Thompson and Greve Races) had one of the new Super-Buccaneer Menasco 290 h.p. engines. The wings of the Folkerts are so small that they have to reach about 100 m.p.h. before they leave the ground, but because of the long fuselage they are comparatively easy to land. The small wing looks like a solid wood fin projecting from the side of the fuselage. Though full cantilever, it is very thin, and its airfoil section is a perfect streamline shape. Most airfoil sections now used are the old Curtiss racing section or the new efficient N.A.C.A 23012 section.

Most interesting of all plywood wings is that on Howard Hughes' record-holding racer, which has plywood covering about one inch thick shaved down one fourth of an inch to give a perfect contour throughout. This plane unfortunately did not appear this year as Mr. Hughes is now laying plans for a trip around the world in a new specially built Sikorsky S.43. The racer is being stored in a well-insulated room with a heater maintaining a constant temperature and a crew of two to guard the airplane that is always ready to uphold its world landplane speed record. However, getting back to the Folkerts, which is certainly a very different type of airplane and which cost only about 10,000 dollars to build, there are many surprising and perhaps amusing features about it. When the pilot is sitting in the ship while on the ground he can dangle his feet out of the "belly" into which the landing gear is retracted in flight. For this reason Roger Don Rae had trouble in preventing his legs from being scratched when on two occasions he landed the airplane with the wheels up!

## *Why do they do it?*

There is perhaps no one who could give a very sensible reason why these racing pilots risk their lives flying such dangerous racers. The best answer is that they just caught the bug and fly for the thrill and glory of it, though at times they win considerable money which just about pays for the airplane and other expenses. Nevertheless, they have done a good job with small horse-power, and it is likely that Menasco may develop an engine of over 300 h.p. in the near future that will further increase the speeds of these "half-pint" racers and make them equal to Michel Detroyat's 335 h.p. ship that beat them all in 1936. Detroyat would have had stiffer competition this year than he had last, but still, perhaps, he would have been able to beat the field in closed-course competition.

As usual there was an assortment of the latest in private and transport airplanes. Waco showed a new cabin plane with a wheel in the nose. Unlike other tricycle-landing-geared airplanes, it was not stalled in when landing, but all three points touched at the same time. This method somewhat eliminates the controversy now going on as to what load factor to use on the nose wheel, as most of these planes are landed in stalling position, causing the fuselage to snap forward on its nose wheel and putting great stresses on it, especially when the brakes are also used. Practically all day for four days the Waco demonstrated its landing qualities. The pilot dived it at the runway, levelled off and touched the ground immediately at a very fast speed, but stopped in a shorter run than the conventional airplane takes. There is no worry of ground looping, and taxying may be easily and quickly effected. There is scarcely an airplane company in the United States that is not designing or building a ship with a nose wheel. It is my belief that the tail wheel will become obsolete within the next few years in the United States.

**Two interesting new military types flown by their makers' test pilots at the meeting. Above is the Curtiss YIP-36 (Twin-wasp) and, on the right, the Seversky P.35 (modified Twin Wasp), in racing trim.**

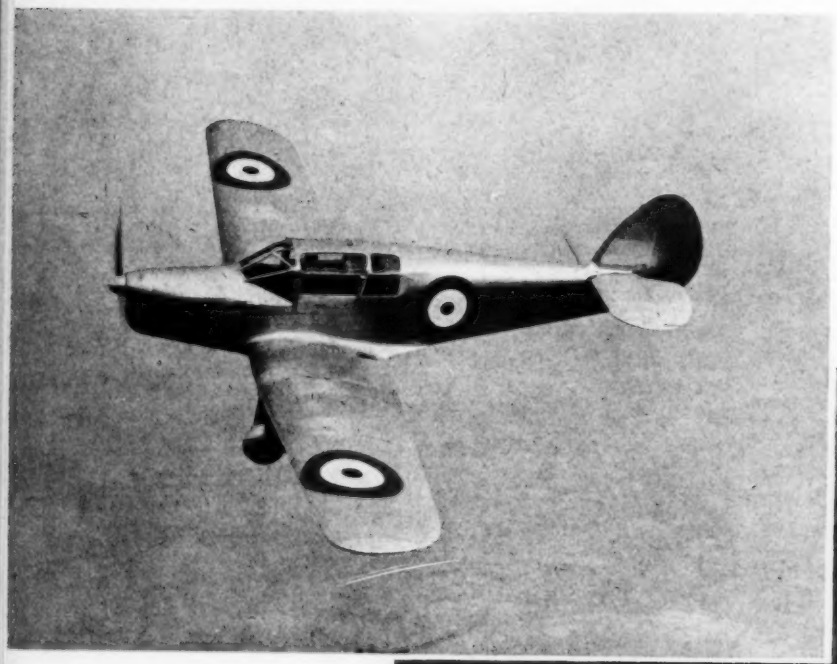
Another airplane of the nose-wheel variety was the Gwinn Aircar which, though it resembled a Jersey cow in appearance, flew very well and obviously handled very easily on the ground. Like the new Stearman-Hammonds, it has no rudder and is turned by banking. A Pobjoy Niagara powers the ship, which is a two-place with an all-metal fuselage. Its four-bladed prop and compactness make it almost as easy to manœuvre on the ground as a car.

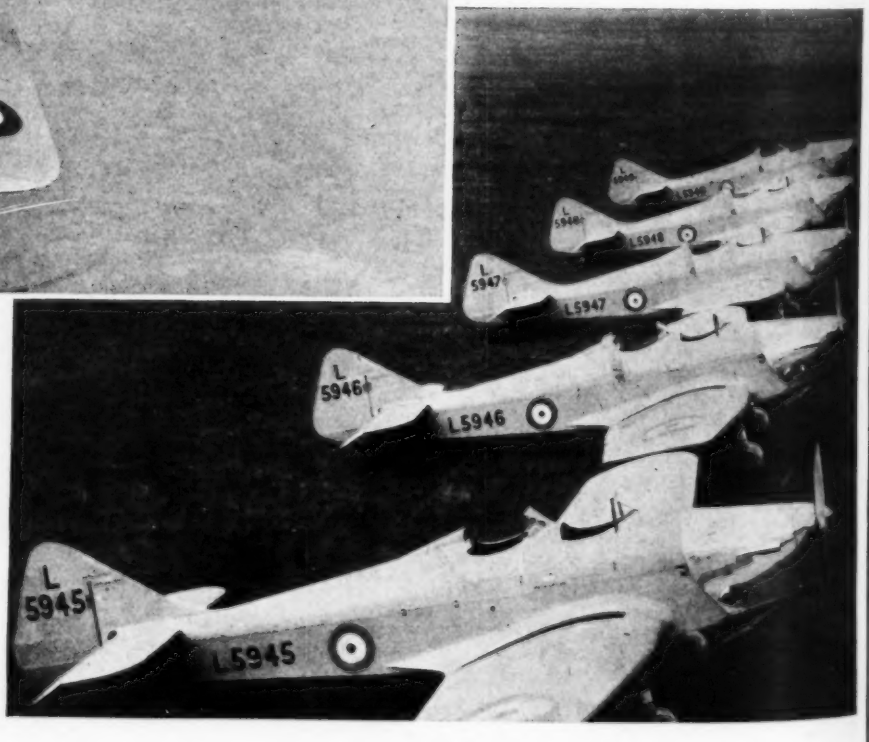
For next year the most outstanding racer will probably be Harry Crosby's new creation. It is all-metal with all the most modern features such as a retractable tail wheel, brakes, flaps, and a 250 h.p. Menasco engine. All this is going to be lifted by a fifteen-foot wing.

The machine may be described as a refined version of Crosby's former racer, which required a run of about a mile to get up in the air, but it will be even more delicate to fly. It has been thoroughly wind-tunnel-tested and should prove a very successful ship.

# LIGHT AIRCRAFT in SERVICE DRESS

*Under-200 h.p. Machines Find Varied Uses*






**Above is seen a Percival Vega Gull (Series I Gipsy Six) which is at present being shipped out to Buenos Aires for the use of the British Air Attaché there, Group Capt. A. J. Miley, and his assistant, Sqn. Ldr. P. C. Wood. A Vega Gull is already in use by the Attaché in Berlin, Group Capt. F. P. Don.** (*Flight* photograph.)

**On the right is a batch of Miles Magisters (Gipsy Major) just emerged from their makers' works at Woodley, Reading. These machines are now in steady production for Service *ab initio* and blind-flying training.**

# HERE and THERE

## Worth Winning

RECENTLY, De Havilland Aircraft of Canada, Ltd., organised a competition, the winner of which would receive a two-year scholarship at the D.H. Technical School. It is now announced that Mr. Robert G. Macleod, of Winnipeg, is the lucky young man.

## Alloy Welding with 30,000 Amperes

A HIGH-POWER spot welding set is the latest product of the Metropolitan-Vickers Electrical Co., of Manchester, and it was shown recently at the Engineering and Marine Exhibition. Its special interest from the point of view of the aircraft industry lies in its ability to weld heat-treated aluminium alloys, including Duralumin. This is achieved by using very high welding currents in the region of 2,000 amp. for extremely accurate and short welding periods and by efficiently cooling the electrodes to prevent distortion of the work owing to surface heating.

In this apparatus the electrodes are separately water-cooled to within half an inch of their tips, and the transformer secondary winding is water-cooled.

## A Really Useful Museum

ANYONE who finds himself in Rotterdam with a few hours to spare should make a point of visiting the Nautical and Aeronautical Technical Institute and Museum there.

The organisation, of its kind, is probably unique, not so much because of the variety of its exhibits as on account of the remarkable lengths to which the library and information bureau system has been carried. The museum, which now enjoys a Government subsidy, was visited last year by 27,093 persons, while 15,311 borrowed books, and 1,282 queries were answered—free of charge.

A Rolls-Royce Kestrel IIS, a Gipsy Six and a Cirrus are among the aero engines exhibited, and the British aircraft industry is well represented in all sections.

A descriptive booklet, in English, is obtainable from the Director, 68, Haringvliet, Rotterdam.

## Lighting the Way Across Australia

AS yet mostly unfamiliar by name, quite a number of Australia's new commercial aerodromes are nearing completion, and among those which will shortly be in full commission are Evans Head, Pine Creek, Canberra, Mascot, Goff's Harbour, Tuncurry, Coolanagatta and Cambridge (Tas.).

G.E.C. beacons have been scheduled for use at and between these aerodromes. In each beacon a 24in. silvered glass reflector of special colour has a 1,500-watt Osram lamp at its focal point, giving a 1,000,000 c.p. beam that is visible for 80 miles in clear weather.

In the event of lamp failure a stand-by is automatically brought into operation.

The first of these beacons has been installed at Evans Head Aerodrome, where, after satisfactory tests, it is now in full commission.

**STAR AND CRESCENT: Messrs. R. H. Somerset and L. Castlemaine, the General Aircraft pilots who, as recorded on p. 353, left Hanworth on Sunday with two Monospars for delivery to the Turkish Air League, which will use them for instruction in parachute jumping. The doors of the machines have been slightly modified for the purpose.**

## When the King was an Adjutant

THE autumn issue of the Journal of the Royal Air Force College has surpassed itself. It is more than usually full of good matter, notably vivid descriptions of the part the Flight Cadets took in lining the streets on Coronation Day and of a month spent by the College at the Armament Training Camp at Penrhos. The chief attraction of the number is an article by Hector Bolitho entitled "King George VI at Cranwell." Prince Albert, as he then was, was Adjutant of H.M.S. *Daedalus* (so did the R.N.A.S. denominate Cranwell) at the time when the Royal Air Force came into being. He lived quietly in a cottage at Rauceby village, and in his spare time worked in the garden and kept chickens.

Later on the Prince was allowed to learn to fly at Croydon, and his instructor, now Wing-Commander W. A. Coryton, M.V.O., D.F.C., is quoted as saying: "He had the rare quality which an instructor always dreams of instilling into his pupil. By instinct he was able to use eyes, hand and brain in unison," and he adds that the Prince was "amazingly quick" at learning to land. The article gives an intimate picture of King George VI as a young man, and after reading it one feels even greater respect than before for his character now.

## Forthcoming Events

**October 14.** R.Ae.S. Lecture*: "The Hafner Gyroplane," by Mr. R. Hafner.

**October 20.** R.Ae.S. Weybridge Branch Lecture: "The Meaning of Education," by W. H. Wakinshaw, M.A., Vickers Senior Staff Canteen, 6.15 p.m.

**October 21.** R.Ae.S. Lecture*: "Practical Airscrew Performance," by Mr. F. M. Thomas.

**November 3.** R.Ae.S. Weybridge Branch Lecture by Flt. Lt. J. W. Summers. Vickers Senior Staff Canteen, 6.15 p.m.

**November 4.** R.Ae.S. Lecture*: "Problems of High-Speed Flight as Affected by Compressibility," by Mr. C. N. H. Lock.

**November 16.** Institute of Transport: Brancker Memorial Lecture: "Civil Aviation as a World Force," by Lord Sempill. Institution of Electrical Engineers, 6 p.m.

**November 17.** R.Ae.S Weybridge Branch Lecture: "Light Alloy Castings and Stampings for Aeronautical Purposes," by W. C. Devereux, Vickers Senior Staff Canteen, 6.15 p.m.

**November 18.** R.Ae.S. Lecture*: "The Take-off Problem," by Mr. H. F. Vessey.

**November 25.** C.A.S.C.: Dance, First Avenue Restaurant, London, W.C.1.

**December 1.** R.Ae.S. Weybridge Branch Lecture: "Large Aeroplanes," by Dr. H. Roxbee-Cox. Vickers Senior Staff Canteen, 6.15 p.m.

**December 2.** R.Ae.S. Lecture*: "Wing Surface Controls with Reference to Possible Developments in Flying Technique," by Flt. Lt. H. P. Fraser.

**December 10.** Strathtay Aero Club: Annual Ball, Salutation Hotel, Perth.

**December 15.** R.Ae.S. Weybridge Branch Lecture: "Anodic Treatment," by J. Donaldson Craig. Vickers Senior Staff Canteen, 6.15 p.m.

**December 16.** R.Ae.S. Lecture*: "Development of Sailplanes," by Sqn. Ldr. G. M. Buxton.

**December 17.** London Aeroplane Club: Dinner and Dance, Park Lane Hotel, London.

**1938.**

**January 13.** R.Ae.S. Lecture*: "Radio as a Direct Aid to Landing Approach," by Sqn. Ldr. R. S. Blucke.

**January 27.** R.Ae.S. Lecture*: "Electrical Ignition on Aero Engines," by Dr. G. E. Bairstow.

**January 28.** Northamptonshire Aero Club: Annual Dance.

**February 3.** R.Ae.S. Lecture*: "Recent Research into the Aerodynamic Characteristics of Aircraft," by Mr. E. F. Relf.

**February 17.** R.Ae.S. Lecture*: "The Maintenance of Civil Aircraft," by Mr. H. L. Hall.

* All these lectures take place at the Institution of Mechanical Engineers, Storey's Gate, St James's Park, London, S.W.1, beginning at 6.30 p.m.

# CORRESPONDENCE

*The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.*

## "USELESS BARBARITY"

MAY I protest against such a progressive journal as *Flight* adhering (*vide* your leading article last week) to the nice, kind, sentimental, but oh! so obsolete doctrine that it is "barbarous" to bomb civilian populations?

For several hundred years civilian populations (and particularly Britain's) have enjoyed sitting back and applauding "our gallant soldiers overseas," and being appropriately overjoyed at their victories and sorrowful at such defeats as might be hinted at in a carefully censored Press. Fed by those same propaganda factories on tales of glorious heroism *ad nauseam*, they have had no conception of war as such.

If a nation is at war, why should not the *whole* nation, from the politicians downwards, be actively embroiled? Why should only a comparatively small proportion, involved either willingly or under compulsion, taste its real horror?

Hundreds of years hence, history will recognise in Spain and China the milestone marking the world's realisation of the futility of war. And it will be aerial bombardment of "undefended cities" which will have achieved that realisation.

Good, healthy fear of the aeroplane and its H.E., incendiary and gas bombs, is the one thing which can (and will) jolt the civilians of the world out of their thousand-year-old servility to and belief in dictators, international racketeers and what, for want of a better term, we call the "military mind."

London, W.1. C. E.

[It is difficult to understand why "C. E." selects air bombardment in particular for his unrestricted warfare. Logically he should approve also of the murdering in cold blood of civilians by the enemy army which will occupy a country after the way has been prepared by air attack. Fundamentally there is no difference except that in the one case the murderer sees his victim and in the other he does not. Once let indiscriminate bombing be accepted as an ordinary means of intimidation, and there is no telling where the principle will stop.—ED.]

## HOW TO LOSE CUSTOM

IN your issue of September 23 you open with a leader, "How to Lose Custom." By the sequence of events rather than by the alleged facts, I managed to identify myself as the pilot of the machine in question.

The restrained manner in which you present the story is, I think, very much to your credit, but perhaps I may be allowed to state what actually occurred:

The passenger was not told that he could not travel. A little momentary confusion may have been occasioned owing to the fact that his seats were not booked in his own name. No one was turned away. Another passenger—not your informant—arrived ten minutes late (250 lb. with luggage) and petrol, as you say, was taken off.

*Both* engines were then run up in the usual way and neither gave any indication of any defect. The machine taxied out about 500 yards for the take-off, and at a height of about 300 ft. the port motor died. A half circuit was made on the remaining engine, followed by a comfortable landing *into* wind.

The cause of the motor fading was a defective petrol cock, which allowed sufficient fuel to be pumped into the carburettor for the engine to be run up, and while taxying out sufficient fuel again accumulated for the take-off, but sustained full throttle caused the engine to be starved.

"Full radio assistance" took the following form. Our position was checked from time to time in the normal way. Five minutes before our E.T.A. we were at 4,000 ft. above cloud, and a QTE was requested from our destination. It showed us to be on our course headed for the airport.

Three more bearings at five-minute intervals had the same result. We were now ten minutes over our E.T.A., so a series of QDM's was requested. The first showed us still heading for the airport, and the second—*half a minute later*—differed by 180 degrees. At 4,000 ft. one does not expect a "motors" signal, so down we went to come out 35 *miles beyond the airport*.

On being tackled, the W/O. at the ground station admitted failing to take "sense" for any bearing but the last!

I need not dwell on the probable consequences had we been going the other way (you know the route). While helping to scrape the bits off a mountain, some first soloist would remark to his neighbour: "The poor mutt must have lost himself rather badly."

On leaving the intermediate stop we had enough fuel to get us home with a half-hour margin, but to crown this glorious day the trailing aerial jammed and would not run out. The weather ahead was not good, and rather than rely on the fixed aerial I returned to fix matters. At the same time it was obvious that a fifteen-minute petrol margin was not enough, and more was taken on. At no time did any passenger mention petrol or a shortage of same.

I will give your friend one mark, though. The final landing was punk.

Now I do not wish to offer any excuse for these incidents, only an explanation, and even that you need not believe—for the customer, as you know, is always right.

However, when passengers accuse pilots of gross carelessness combined with a complete lack of the elements of Third Class Navigation, they are almost certain to get something thrown back at them, and here it is.

I append my name for your eyes in token of good faith, but for others I regret that I must remain

Croydon. WUN WING LO.

[A very nice and informative letter and there the matter will have to rest for the moment. The implied criticism now seems to be directed at the unfortunate ground W/O. concerned. Our story, incidentally, was obtained from two sources, and the unsolicited remarks of the second "source" certainly confirmed those made by the first.—ED.]

## THE HUMAN MOTOR.

SOME recent correspondence in your columns, which involved the question of man-power, was interesting. May I quote some empirical figures from mountain-climbing experience on the Pacific coast?

In estimating the time likely to be involved in any particular trip, mountain climbers customarily allow for a climbing speed of 1,000 feet per hour for a mixed party of amateur climbers. The descent will be made in from one-half to one-third of the time required for the ascent. Such an estimate would hold good for comparatively easy peaks of six or seven thousand feet elevation and for trips of from ten to fifteen hours, including the descent.

To quote common figures for a very customary short journey from Mosquito Creek intake to the B.C. Mountaineering Club cabin on the slopes of Grouse Mountain, the elevation of the cabin being approximately 1,000 feet above the intake. The usual time allowed for this trip, including a short rest, is forty-five minutes. Such a speed will bring about a slight panting and some degree of perspiration on the part of the average city climber; the climbing speed in this case averages 22 feet per minute.

With an empty pack and "all out" this trip has been made in twenty minutes; the climber is winded and bathed in perspiration when he reaches the cabin; in this case the climbing is done at the rate of fifty feet per minute. It should be said that the average grade is about one in five and that the trail is comparatively easy.

It may, then, be safely said that man-power cannot much exceed the above rate of doing work; in this last case the climber may weigh 150lb. and is raising his body at the rate of 50 feet per minute; he is then working at the rate of 7,500 foot lb. per minute or 0.227 h.p.

May I say that in engineering circles on this continent it is usual to rate man's power to work at one-tenth of a horse-power for an eight-hour day?

Vancouver, B.C. CHARLES SAUNDERS.

[Although the controversy on "Man-power Flight" is now closed, we feel that the above letter from abroad is worthy of inclusion for the intrinsic value of its information.—ED.]

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## TO ASSIST THE MOTORIST

THE thirteenth edition of *"The Autocar" Handbook*, entirely rewritten, is now available.

It is completely up to date and has a section devoted to independent suspension and the various transmissions now popular are fully explained and illustrated. New features are chapters on Coachwork, Care and Maintenance of the Car, and Law and the Motorist.

*"The Autocar" Handbook* is published by Iliffe and Sons, Ltd., Dorset House, Stamford Street, London, S.E.1, at 2s. 6d. net.

The flying test-bed for the Bristol Hercules engine is a Northrop monoplane. Note the long-chord cowling with controllable cooling gills. The position of the air intake above the cowling is interesting.

# SOMETHING UP ITS SLEEVE

## *The Bristol Hercules Engine Starts Its Flight Tests*

QUITE a sensation was caused at the Paris Aero Show last November by the first appearance of the Bristol Aeroplane Co.'s brand new fourteen-cylinder sleeve-valve air-cooled radial. The Hercules, as this engine is called, was granted the British Air Ministry's type approval some time ago, and is the most powerful British engine to have this approval. Already a series of flight trials has begun at the Bristol Company's aerodrome at Filton.

It will be recalled that, as previously recorded in *Flight*, the Hercules is a double-row radial with a bore of 146 mm. (5.75in.) and a stroke of 165 mm. (6.5in.), giving a total capacity of 38.7 litres, or 2,360 cu. in. The first version, which is the one that has just begun its flight tests, is medium supercharged and delivers 1,290 b.h.p. for take-off at 2,650 r.p.m. The maximum permissible power for a period not exceeding 5 min. is 1,375 b.h.p. at 2,750 r.p.m. and 4,000ft. (1,220 metres). The maximum specific output of the medium-supercharged version is thus 35.5 h.p. per litre. Allowing for the usual process of development, this figure will doubtless be further improved as and when experience has accumulated as a result of the present flight trials.

The fourteen-cylinder Hercules develops 1,290 b.h.p. at 2,650 r.p.m. for take-off, and a maximum of 1,375 b.h.p. at 2,750 r.p.m. at 4,000 ft.

The Hercules, it is known, is destined for certain types of Service aircraft, but as it was desired to get flight trials completed as soon as possible, and as the new prototype aircraft for which the engine is intended are not yet ready for flight, the Bristol company decided to obtain from stock, as it were, a type capable of serving as a flying test-bed for the engine. The choice fell on a Northrop monoplane, which has the necessary strength factors to take the great power developed by the single engine unit.

In addition to maximum speed and climbing trials, the machine will be used for the investigation of cooling characteristics, for which tests a very complete set of apparatus has been installed to measure temperatures and air flow.

Closely connected with the question of cooling is the problem of fuel consumption. It will be recollected that the smaller Bristol sleeve-valve, the Perseus, which underwent actual operating trials in the Short *Syrinx*, belonging to Imperial Airways, demonstrated remarkable fuel economy, and the Hercules will be tested in the Northrop by long periods of flying on weak mixture strengths. The impending adoption of 100-octane fuel will doubtless play its part in further improvement.

The two years or so of continuous development work which has already been carried out on the Hercules will thus culminate in a lengthy and very searching flight test period (the present programme calls for about 200 hours), which should, as the Americans say, get all the bugs out of the engine before it goes into actual service.

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## *Death of Major Baden-Powell*

THE brother of Lord Baden-Powell, Major B. F. S. Baden-Powell, late Scots Guards, died last Sunday at Sevenoaks at the age of 77. He was an early pioneer of air work of all sorts, ballooning, airships, aeroplanes, and, in particular, man-lifting kites. In 1894 he made experiments with man-lifting kites at Pirbright, and the War Office showed some temporary interest in them. He was not allowed to take them to the South African War, though before the battle of Magersfontein Lord Methuen asked him to send one up to take photographs. At that battle captive balloons scored their first notable success in action.

Fifty-seven years ago Major Baden-Powell became a member of the Royal Aeronautical Society, undertook the work of honorary secretary, and later became the president. His aeroplanes were not a great success, and his connection with airships was represented by a model exhibited at Olympia in 1909. He remained an enthusiastic balloonist until late in life. His other activities were varied, but it is to him as a pioneer of the air that *Flight* respectfully offers this small tribute.

RESURRECTION AT BROOKLANDS: A year after the Great Fire, the new Brooklands Aviation flight shed, stores, workshops, offices and lecture rooms are now in working order. They are all incorporated in one large building. The "R" in the lower right-hand corner concerns the circuit rule for the day ('ware St. George's Hill!). (*Flight* photograph.)

# PRIVATE FLYING

## *Topics of the Day*

### *Little Fellows*

WHILE one or two manufacturers of ultra-lights have unfortunately faded away, the others are still carrying on with development work in preparation for the next season. They are disappointed not to have seen more customers among the thousands of young people who are undoubtedly interested in this flying business, but no really far-seeing person could have expected any sudden boom in such a class.

Confidence has to be built up gradually, and the maker who can stick it out and still produce something which is inexpensive, useful and reliable will see something for his pains in due course. The whole thing has been rather too experimental in the past year—prospective purchasers like to be given an impression of solidarity both in the machine and the background.

I still claim that what is really wanted is a pair of engines made by a reputable firm in the 30 h.p. and 50 h.p. sizes. If such engines were available and were likely to continue being available, the ultra-light manufacturers would have something around which to build their final ideas of an inexpensive aeroplane. At present any old engines—some of them years old—are fitted to singleton experiments. They can hardly expect to obtain results in such circumstances.

Needless to say, if any one of the well-known manufacturers had come out with a little fellow, the entire story would have been different. People are, somewhat naturally, loath to spend two or three hundred pounds on something which may or may not be satisfactory and which may or may not be a saleable proposition at the end of a year or two.

### *False Prophets*

GOODNESS knows that no private or transport aeroplane is quite perfect, and that one or two of those which have, in the past, actually got into service, or been sold to private owners, have been thoroughly bad in a number of ways. Nevertheless, a great deal of libellous nonsense about certain machines has been persistently circulated amongst pilots and others from time to time, while a few machines, each possessing some dangerous characteristic, have received very little but praise from those who rule the gossip roost.

Unfortunately, each novice and near-novice, as well as each budding transport pilot who is just going on to bigger stuff, sits at the feet of one particular oracle and believes every word he says. Otherwise, it would be sufficient to remind more easily influenced people that nearly every oracle has a different story to tell and that their stories do not often hang together.

It would be amusing to collect a series of statements about different aeroplanes and to tabulate them. Such a collection would be rather pointless unless the sources of the statements as well as the names of the machines were given—which would be both unkind and unfair, particularly as the sources may have changed their minds since I last heard their views.

If all this gossiping could be carried out at a round-table conference of designers, instructors and test pilots, nothing but good could come of it, but the usual result of bar discussions is that a minor defect is exaggerated out of all reason by people who have never even been up in the machine concerned. The Appleyard Aniseed monoplane, for instance, was once spun in off a gliding turn made with full bottom rudder at a speed of 50 m.p.h. or less; within a week one learnt that it was unsafe to make a gliding turn with the Aniseed at any speed less than 70 m.p.h. Some careless expert trailed a wing-tip with the Baldock Beagle, and immediately the bars hummed with the information that the Beagle (and its latest development, the Babbit) dropped a wing at the slightest provocation, and that it had to be brought in at an air speed of not less than 70 m.p.h.

On the other hand, I was once told that a certain little aeroplane was extremely strong and as safe as houses. Yet, later, I knew for a fact that it would only fly on full throttle, that it spun without much provocation at any low speed, and that its designer knew very little about designing either aeroplanes or perambulators. Another machine, I was told, sank on a level keel at the stall and could hurt nobody; when I tried it the "level sink" consisted of a sharp flick over almost on to its back—though admittedly the machine was immediately under full control again, and the amount of height lost was quite small. Yet another safe aeroplane obstinately refused to come out of a medium gliding turn during several seconds; if I hadn't had fifty feet of extra height I should have hit something. These, however, are exceptions; the bark is usually much worse than the bite.

### *Subsidy Effects*

SO far, I have only heard of one club which has shown any sign of reducing its fares following the introduction of the new subsidy scheme. It is early yet, and the differences are not, after all, so very great. The majority of the clubs had already fixed their rates at an almost uneconomic figure, and the new subsidy should just about balance the losses which many of them have suffered through the introduction of the Volunteer Reserve scheme.

All clubs, however, might find that it paid them to arrange a specially reduced rate for contract flying. Any

member who was prepared to buy the complete twenty hours' subsidy flying in advance might, so to speak, have some of the subsidy returned to him by way of encouragement. Clubs, too, may now be better able to afford to hire out their machines for cross-country work, since it is better for them that one member should put in twenty hours' flying than that this amount should be divided among half a dozen casual week-end pilots. Everything, in this case, would depend on the number of members who were heading for their much more profitable "A" licences.

Incidentally, the new regulations concerning the fitting of turn indicators to machines used for "hire or reward" work must be hitting some of the less prosperous clubs rather hard. The cheapest of blind-flying instruments is a fairly expensive item when one has to be fitted to each of several machines. However, the need for the regulation is obvious, and the machines which are so equipped will be proportionately more useful. INDICATOR.

# FROM the CLUBS and SCHOOLS

### LONDON

The flying times for last week were 93 hr. 55 min., and Mr. P. R. Tabor completed the tests for his "A" licence. Among the new members during the week were Messrs. S. Loch, W. J. Wearne and Mrs. King-Farlow.

### C.A.S.C.

Visibility was very bad at Fen Ditton last Sunday morning, but when the weather cleared members were able to fly for 6 hr. 35 min.

### YAPTON

During September a total of 166 hr. 20 min was spent in the air and 10 hr. 25 min. for the first two days of October. First solos were made by Messrs. A. L. Pellegrini and T. Flack.

### ISLE OF WIGHT

The Isle of Wight Flying Club held a party on September 25, and Mr. J. Raddings won the landing competition. He beat Mr. G. Gazzard by only four yards.

### EDINBURGH

Heavy gales have handicapped flying at Edinburgh, and the total for the month of August was assessed at 105 hours. Several cross-country flights have been made.

### CAMBRIDGE

Although fog suspended flying at Marshall's School on October 3, 60 hr. 45 min was spent in the air during that week. A new member is Mr. Rajwade.

### LIVERPOOL

The Liverpool and District Aero Club announce that from October 3 flying will commence at 10.30 a.m. daily. A total of 202 hr. 45 min. flying was recorded for September, 1937, and for the year up to Sept. 30, 2,015 hr. 25 min.

### YORK AND LEEMING

Mr. and Mrs. Alex Monteith gave a most successful "Farewell to Wings" party on September 25, although bad weather did forestall many people who were coming by air. September yielded 142 flying hours.

### HULL

The Hull Aero Club is planning a big flying season for the winter. They do not believe in hibernating for the cheerless months. Dances are to be held every month for members, and a table tennis team is being organised.

### WITNEY AND OXFORD

Another Gipsy I Moth has been added to the fleet and a squash racquets club has been formed. Membership of the latter is available for an inclusive fee of 1 guinea. During September flying amounted to 65 hours.

### BORDER

The Border Flying Club's annual general meeting will be held on Tuesday, October 2, and the annual dance on November 24. Cross-country flights were made during the week to Coventry, Castle Bromwich and Hatfield, but more members are concentrating on solo flying for their "A" licences.

### STRATHTAY

Mrs. Watson and Messrs. Henderson and Tosh have completed their "A" licence tests, and Mr. A. M. Mackay made his first solo. A new member is Mr. J. G. Gow. Flying times for the week ended September 26 amounted to 22¼ hours.

### YORKSHIRE

Yorkshire seems suddenly to have turned air-minded *en masse*, and twenty-one new members have joined within the last few weeks. Dr. J. G. Ollerenshaw, of Skipton, made his first solo flight. Flying was estimated at 48 hr. 55 min. during the week ended October 3.

### SOUTH COAST

On October 2 the annual dinner and dance was held at the Grand Hotel, Brighton [and duly reported in last week's issue.—ED.] One member has purchased a new B.A. Eagle, which he intends keeping at Shoreham. Just over 30 hours' flying has been done.

### BROOKLANDS

On Sunday the aerodrome was in possession of members of the Society of Model Aircraft Engineers. Petrol and rubber-driven models made remarkable flights, and one model not only was fitted with a retractable undercarriage, but also a folding airscrew which "retracted" when the power ran out! Five new members joined during the week. Flying times totalled 85 hours.

### NORFOLK AND NORWICH

A Guest Night, the first of a series of social events arranged by the House Committee, was held on Friday, when over fifty guests sat down to an informal supper. A Supper Dance on Friday, October 15, will be the second event in this series. Mr. E. L. Pearce has obtained a passenger-carrying certificate, while the Hon. D. Keppel and Mr. H. A. Smith made first solos.

### CINQUE PORTS

A very interesting visitor to Lympne was a 1916 Hanriot, which was flown from Brussels by Mr. R. Shuttleworth to add to his collection. In spite of its journey and age it was in very good condition. A new member—Mr. C. Saunders, from Chile—has purchased a Miles Whitney Straight to take back home with him. A successful solo was made by Mr. D. Curry and a total of 84 hours' flying was recorded, mostly on dual.

### NEWCASTLE

Flt. Lt. D. G. Allison, formerly assistant instructor at the Midland Aero Club, has been appointed chief instructor and took up his new duties at the week-end. He arrived just in time to witness a typical example of weather so delightfully (*sic!*) peculiar to the North-East at this time of the year and—unfortunately—for the next few months. Nevertheless, a total of 25 hours were logged for the week and total hours for the year are still in excess of those at the corresponding period last year, when a record was established.

### HANWORTH

The London Air Park Flying Club welcome Mr. J. H. Wingate-Hill, who has joined the staff as an instructor. Mr. B. Buchegger, who obtained his "A" and "B" licences at the club, is to be congratulated on his obtaining a position as personal pilot to Mr. W. H. Berriedale-Johnson. Several cross-country flights were made, and a total of 119 hr. 45 min. was recorded. Dr. J. A. Mains made his first solo and carried out his "A" licence tests during the week, and Mr. W. Hein is concentrating on blind flying.

**THE NEW EAGLE.** During the past few months British Aircraft have been trying out a new version of the well-known Eagle. This has a fixed undercarriage, and, for those who prefer to be relieved of retractable responsibility, the machine has certain definite advantages. The greater virtual wing-area and the decreased drag have resulted in a considerably improved take-off and a slower landing, while the cruising speed (at 2,000 r.p.m.) is still rather better than 120 m.p.h. (*Flight* photograph.)

**DUAL PURPOSE:** The much-talked-of Pitcairn "Roadable" Autogiro in its latest form. The Pobjoy Niagara which powers the machine is installed "on its side" in the fuselage and is cooled by special air-ducts. Curiously enough, the machine does not appear to be quite as fast as it was when the engine was mounted conventionally in the nose. Probably the air-duct system introduces new air-flow problems.

## A Soaring Year

ON July 31 the Yorkshire Gliding Club completed its seventh year, during which 68 International Gliding Certificates (27 "A," 23 "B" and 18 "C") were obtained by members. Twenty-nine of these were awarded during the first instruction course at Sutton Bank last year; this August course is to become an annual event. If there is sufficient demand, the club proposes next year to run an advanced course.

Three members—Flt. Lt. P. M. Watt, P. A. Wills and J. C. Neilan—were included in the International team, and the machines used, King Kites, were made at the works of F. N. Slingsby, who is on the committee of the club.

## Minor and Major

FOR some months now work has been going on with the development of an improved version of the Luton Minor monoplane in the new works of Luton Aircraft, near Gerrard's Cross, Bucks. The new machine is now almost finished.

It is fitted, for the present, with an A.B.C. Scorpion flat-twin, but Captain Latimer Needham has been putting in a good deal of work, by way of making it more suitable for the job, on the Anzani engine which was used in the original machine. This engine certainly produces power for weight, but the manufacturers themselves appear to have been busy on Government work and have not been able to get down to the business of its modification for light aircraft use.

Meanwhile, a new version of the Buzzard pusher, with a coupé top, is taking shape and it is probable that a two-seater Minor, somewhat naturally to be called the Major, will appear next summer. The very interesting tandem-winged monoplane, which was, in fact, the Minor prototype, may yet reappear; research people have shown some interest in the wing arrangement, but various snags appeared during the flight tests and a good deal of time and money would need to be spent in test work before the scheme could be made practicable.

## Air War in the "Green Hell"

*"Gran Chaco Adventure," by T. Wewege-Smith; 12s. 6d., Hutchinson and Co.*

MR. WEWEGE-SMITH, becoming weary of a humdrum job in London, joined the French Foreign Legion. Then, like a good many other soldiers of fortune, he decided that it lacked the romance which the novelists promised. He deserted. Having learned to fly at the old London Aeroplane Club, and at Lympne, and being an officer of No. 601 Squadron, A.A.F., he felt that a war pilot's job would give him the outlet he needed. Casting round—this was in 1934—he discovered that Bolivia and Paraguay were about to fly at each other's throats, and forthwith offered himself as a pilot to Bolivia's air force—a precariously maintained establishment of thirty-odd aircraft chiefly consisting of various types of Curtiss, with a few Junkers and a Vickers Vespa thrown in.

On arrival, he found that a reputation had preceded him. His superior officers were convinced that he was a Schneider Trophy winner. They had confused that prize with the Esher Trophy, which, as a member of the successful A.A.F. team, he had helped to win in 1928!

The author (he gives generous acknowledgment to his collaborator, H. Kingsley Long) deals with his flying duties—chiefly bombing—in the "Green Hell of the Gran Chaco." This delectable piece of territory for which some thousands fought and died is nicely summed up . . . "A whirl of sickness, heat, scorpions, 'planes, machine guns, rats, rain and mud, croaking frogs, flies, fleas, mosquitoes and *marihui* all mixed up in a queer drunkard's dream."

To which it may be added that the Mess of which the author was a member was at times reduced to drinking cocktails compounded of such ingredients as medicinal alcohol, black coffee and Kolynos toothpaste.

With touches like this, Wewege-Smith graphically conveys the torrid nightmare of the Chaco campaign, though it must be said that he also transfers to his book too much of its monotony.

**MORE POWER FOR THE TIPSY:** A single-seater Tipsy monoplane has now been fitted with a 40 h.p. four-in-line inverted Train engine, giving the machine a cruising speed of 110 m.p.h. This special Tipsy is sold over here by Brian Allen Aviation, of Croydon, at £395.

# CONTROLLED IMPREGNATION

## *An Interesting Development in the Application of Synthetic Resins*

THERMOPLASTIC materials are already finding quite wide application in aircraft construction, particularly in the form of moulded transparent sheets for windows, windscreens and the like. Thermosetting materials, on the other hand, have not as yet made the rapid progress which some expected. This is largely due to the fact that these materials, once they leave the dies in which they have been moulded under great pressure and considerable heat, become inert and difficult to cement together satisfactorily. To mould them in large sizes, thereby reducing cemented or bolted joints to a minimum, is rendered costly by the need for large dies, as moulding pressures of 3-4 tons per square inch are required.

A process which has been gradually evolved during the last five or six years now seems to have reached a stage where one can begin to visualise its application to smaller components of aircraft at least, even if the ultimate ideal of being able to mould a complete wing in one piece cannot be said to be in sight.

The story goes back several years. It began in Finland. There a method was discovered whereby thin wood veneers could be pressed into double curvatures by relatively simple and inexpensive means. Such things as dinghies and canoes were built by the method, and had the merit of extreme simplicity and cheapness, but at the time it was not known how water soakage could be prevented. A dinghy built according to this principle was exhibited at a show in London, but, as the effects of water soakage were uncertain, the process languished.

### *Enter JIC*

What was obviously wanted was some form of synthetic glue or cement which could be used to impregnate the wood and render it less hygroscopic. Halila, Ltd., of Bush House, Aldwych, London, W.C.2, had a great deal of research work carried out, and ultimately their chemists discovered a synthetic resin with the desired properties. Known as JIC, this cement can be used not only for joining together the laminations of plywood but also for impregnating the whole sheet or thicker component, and it has the further advantage that the degree of impregnation is under perfect control so that, if desired, a plank made up of numerous laminations can be made progressively stronger from one end to the other. This at once suggests the possibility of application to airscrews, as the root portion could be strengthened by a greater quantity of the filler, while the blade portions could be kept light.

Wood in the form of panels impregnated with JIC has been found to have excellent non-hygroscopic qualities. The water absorption, after prolonged immersion, amounts only to some 2 to 3 per cent. by weight, which is very much less than we used to suffer in the old days of wooden hulls and floats for seaplanes.

Before the process of building complete aircraft of impregnated wood can become really cheap, the present method of stabilising thin panels by a multitude of small ribs and stringers will have to give way to something much simpler, something with considerable bulk but of low weight. Balsa wood at once suggests itself, and has been used in the De Havilland Albatross to stiffen thin plywood as well as to afford a considerable degree of soundproofing. But Balsa wood cannot be moulded, and where double curvatures have to be negotiated, it becomes necessary to use the wood in relatively small pieces and to shape them in accordance with the curvatures aimed at.

Looking about for a substitute, the properties of a synthetic rubber product called Onazote seemed to offer possibilities. This material had previously been suggested for use in aircraft construction, but a cement which joins it securely to some other material had yet to be found. It was discovered that JIC would do this very satisfactorily, and with that discovery the road seems to be open for fairly rapid development.

### *Reinforcement*

Onazote can be obtained in the form of sheets or mouldings. It is a form of sponge rubber, but comparatively hard, so that it has considerable stiffness. A panel formed by an inner layer of Onazote and two outer layers of plywood impregnated with JIC becomes remarkably stiff. In another form one may visualise a leading edge of an aeroplane wing being made up of an outer layer of the impregnated plywood with a thickness of Onazote stiffening it on the inside. The rubber material adds no more to the weight than would the requisite number of nose ribs, and the work of applying it should be far less.

It is, of course, well known in the aircraft industry that the De Havilland Aircraft Co., Ltd., has for a long time been interested in the application of plastics materials to aircraft construction. The particular manners in which the fundamental Halila processes can be modified and adapted for aircraft use have been developed by the De Havilland company, following upon research and experiments made in co-operation with Halila, Ltd. At the moment it is not permissible to state how far along the road to all-plastics construction these two firms have progressed, but the De Havilland Company has taken out patents in this connection, and it will be recalled that some time ago the company announced the production of a small experimental type, the D.H.94, which made its first test flights towards the end of June, and it was foreshadowed (see *Flight*, July 1) that the 94 might be the forerunner of certain interesting structural developments. The 94 is fitted with the 75 h.p. Gipsy Minor engine.

## MILAN REVIEW

(*Continued from page 352*).

Some of the new Italian engines—particularly the two rows by Fiat and Alfa Romeo—are worthy of a study which cannot, for reasons of space, be pursued at the moment. I was struck particularly by the newest Alfa creation, an eighteen-cylinder model with Bristol-like cylinders. Junkers have the Ju.211, an inverted vee-twelve of larger capacity and output than the 210. This is obviously a reply to the big Mercedes, and gives a maximum of 945 h.p. for a weight of 1,278 lb. I found myself wondering what future the new 850 h.p. Bramo Fafnir has before it. Strange, building a brand-new type of high-powered single-row radial these days.

Gnome Rhones were due to show a P.18 engine, probably a development of the L.18, which seems to have been having a particularly painful teething period.

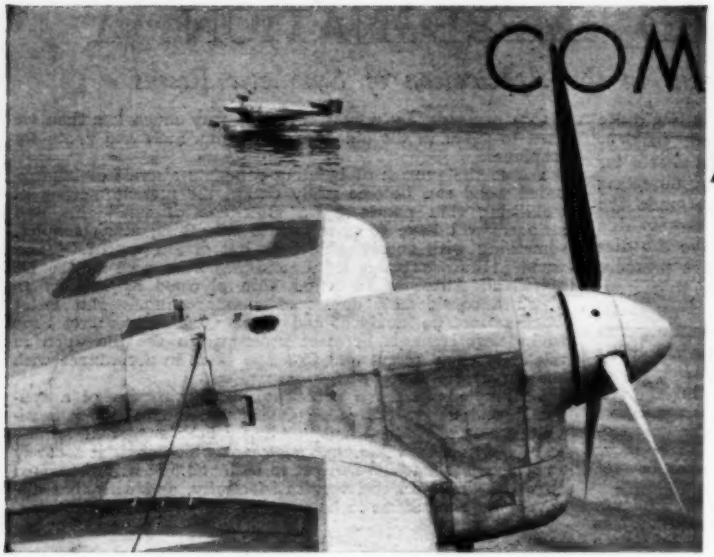
The engines are deserving of a better fate than this mere mention, and I hope to correlate for a future issue some data which I gathered.

The return trip, with delays at Milan, a cancellation from Cologne and real English QBI at Croydon might have been irritating were it not for the ethereal splendour of the Alpine lakeland seen in its full glory in the autumn sunlight. General Goëring has said of the Alps that, formerly a menacing and insuperable wall, they are now but a beautiful landscape, increasing the charm of flying. He is right there.

## DEATH OF WING CDR. DYKE ACLAND

IT seems a special tragedy when a serving officer of the R.A.F. loses his life in an accident to a civil aeroplane. The crash of the Imperial Airways flying boat *Courtier* in Phaleron Bay cost the life of Wing Cdr. W. R. Dyke Acland, D.F.C., A.F.C., who had just given over the command of No. 70 (Bomber Transport) Squadron at Hinaidi and was on his way home.

Coming from a well-known family, William Reginald Dyke Acland was born in 1894, and was educated at Winchester. When the war broke out he enlisted in the R.N.A.S. and went out to the Dardenelles, but in 1916 he received a commission and learnt to fly. He made a name for himself by his skill in landing on the decks of carriers. He received the Distinguished Flying Cross and was twice "mentioned" for air patrols, some of which were made in the Baltic. After the War he received a regular commission in the R.A.F. He passed through the Staff College at Andover and was afterwards an instructor there. He also served in the Air Ministry and held other posts of importance in the Service. Altogether he was a distinguished officer who the R.A.F. could ill afford to lose.



# COMMERCIAL AVIATION

## THE WEEK AT CROYDON

*Uniformity : Freight Only : A Question of Rates : Personalities : Winter Services : The Fun of The Fair*

ON Monday and also on Tuesday last week D.L.H. brought German motor racing teams from Berlin to London to compete in the International Grand Prix at Donington Park. First came the Mercedes team and then that of Auto Union, amongst whom was Herr Rosemeyer, who is himself a pilot and the husband of the famous Fraulein Elly Beinhorn.

One of these teams arrived in identical green suits and berets—which raised the question: What is a uniform? Is it complete uniformity of kit and equipment, and could one dress a thousand gents in identical civilian suits, hats, gloves, spats, ties and buttonhole flowers, equip them with a thousand neatly rolled umbrellas, and march them—at the slope—through London in pursuit of some vague political idea? A good one, by the way, might be: "Give England back her colony—i.e., America."

### *Free Trade*

During last week, also, International Air Freight started operations between London and Amsterdam. It is noteworthy that Holland should have given this company unrestricted permission to operate, although freight rates which have been agreed to by all other companies—British Airways, for example, D.L.H., and A.B.A.—have been undercut, it is understood, by the newcomer. Holland thus gives practical proof of her firm belief in the freedom of the air.

Certain other countries which do not see eye to eye on every question are rumoured to have refused to allow I.A.F. to operate, or to have at least made their permission dependent on the quoting of the standard freight rates. How far this rumour is true I am unable to say, and it may be that permission is only temporarily withheld. The situation is, however, an interesting one.

Ask most people who have been in the air transport business for years if freight alone can be made to pay, and they will answer "No." Most of the possible profit disappears in the complicated and expensive nature of Customs formalities, especially in England, where large and expert staffs have to be employed to clear, to prepare formidable "duty entries" and other complicated documents, to adjust duty deposits and so forth. Endless correspondence with customers is also involved, owing to Customs queries, and then, of course, there is the by no means inexpensive road transport and the whole business of despatch to provincial centres by train, involving accounts work between air and rail companies.

If I.A.F. can surmount these difficulties and make air freight a paying proposition, they will deserve congratulation. It is perhaps a pity that circumstances should have obliged the new company to start operations at the beginning of the winter period when regularity is most difficult to achieve.

Another special D.L.H. machine came in last week with Herr von Ribbentrop, the German Ambassador, and Herr Bohle, leader of the National Socialist Foreign Organisation, who spoke at the German Harvest Festival held at the Porchester Hall. Somebody ought to return the compliment and go to Berlin to address the British colony, who would dislike it intensely, I am sure. Miss Enid Cruikshank, playing lead in "The Grand Duchess," an Offenbach operetta in Manchester, left after the show one evening by train, arrived in London, rehearsed with the B.B.C. Empire Orchestra, then broadcast from Elgar's "Sea Pictures," and immediately afterwards motored to Croydon. She caught a special North-Eastern Airways machine for Manchester, and played there the same evening.

On Friday there was considerable activity on the Paris route, to do, no doubt, with the Exhibition. Imperial Airways sent off two fully loaded Forty-Twos at 3.30 and 3.45 p.m. respectively, followed fairly shortly by a D.H.86. Probably there will now be a rush of English people to Paris, where they will change their pounds into francs and make antic-hay (or whoopee) whilst the sun shines.

### *Way Back*

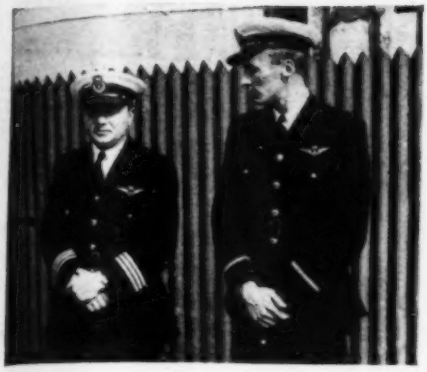
Last week I noticed at Croydon a very old friend whom we have not seen for some years—Le Capitaine Favreau, one of the pioneers who flew, I think, for C.M.A., or its rival, Grands Expresses Aerien, away back in 1921, when he was one of the most popular pilots in civil aviation. Favreau is, like the rest of the pioneers, a trifle grey these days, but still the same charming person.

Most of the companies' winter time-tables are now in print. Although there are fewer services, there are still twenty-eight departures and twenty-eight arrivals at Croydon daily. This number, when QBI is in force, is quite sufficient to make the control tower officers write up for a bottle of the stuff which, though not a dye (No, no!), restores grey hairs to their normal colour.

Right from the start the authorities have been terribly genteel, up-stage and public-school-spirited with the poor commercial coves at Croydon about anything blatant in the way of posters and so forth in and around the Main Hall—except, of course, within their own offices and behind their own counters. Now, it seems, vast advertising spaces in the Immigration Hall have been hired from the authorities by owners of proprietary brands of this and that. Incoming passengers are urged in three languages and highly coloured print to comfort, nourish and sustain themselves with So-and-so's Whatsisname, and it is not unfair to assume that fruit machines and those jolly things labelled "What the Butler Saw," and, in fact, all the fun of the fair, may shortly be installed.

And why not allow advertisers to use the flying field itself and mutely cry their wares in huge chalk letters spread over an acre or two? What could be nicer for incoming passengers than to know in advance, for example, that "Pifflewangle's Pork Pies Promote Post-Prandial Peritonitis"?

A. VIATOR.



**ATLANTIC CREW : The fact that *Cambria*, on the last of the season's Atlantic experiments, had crossed in record time was recorded in *Flight* last week. Here is the crew of the ship. From left to right they are : Capt. G. J. Powell (commander), First Officer C. E. Elder and wireless operators P. A. Woods and H. Dangerfield. The crossing was made in 10 hr. 33 min.**

## *London—Hamburg Non-stop*

BRITISH AIRWAYS' winter schedule includes the operation of a daily non-stop run between Croydon and Hamburg on the Scandinavian service—which operates to Copenhagen and Malmö until such a time as the Stockholm aerodrome is ready for all-the-year-round use. Four daily services will be run to Paris, with three on Saturdays and Sundays.

## *Flat Rate Mails*

SINCE October 4, all first-class mail (letters and postcards) prepaid at the ordinary international postage rates (viz., 2½d. for the first ounce and 1½d. for each additional ounce for letters and 1½d. each for postcards) for Belgium, France and Italy has been despatched by air each weekday morning.

As a result of these and previous changes, letters and postcards for the whole of Europe (except Gibraltar, Malta, Portugal and Spain) will be despatched on weekdays by surface or air transport, whichever offers the quicker delivery, without the payment of an air mail fee.

## *The Athens Accident*

THREE passengers lost their lives and four others were injured when the Empire boat *Courtier* broke its hull while putting down in Phaleron Bay, near Athens, last Friday (October 1).

Apparently, the visibility was poor at the time and the sea had that smooth, mirror-like surface which is so disconcerting to flying boat pilots. Capt. Poole, the pilot, evidently misjudged his height and glided straight in. A moment or two after the impact, which tore the planing bottom out, the machine filled and sank. The crew, who were all on the upper deck, managed to escape with comparative ease.

An obituary of Wing-Cdr. W. R. Dyke Acland, one of the passengers who lost their lives, appears on page 363.

## *Orkney Mails*

BY twelve votes to seven, Orkney County Council on October 1 approved of the Post Office scheme to utilise the daily service of Highland Airways between Kirkwall and the various north isles of the county for the carriage of daily air mail.

Various members opposed the scheme on the ground that the Orkney Steam Navigation Co., losing £1,600 a year in mail subsidy, might endeavour to recoup themselves by increasing the livestock freights. The air mail scheme included parcels, and will result, for example, in a London letter reaching a minor island in 20 hours as against three, four or five days. There is already a daily mail service from Inverness to Kirkwall on the Orkney mainland.

## *"Q" Code Additions*

DURING this month it is probable that a new edition of A.P.1529—"Abbreviations to be Used in the Civil Aeronautical Radio Service"—will appear. Since the last edition was published a number of minor changes have been made, the latest of these being given in *Notice to Airmen* No. 213.

Possibly the most interesting addition in this is QGF, which might be described as a super-QDM, the aircraft W/O demanding and receiving the machine's position expressed as a magnetic course to steer with zero wind (QDM) with its distance from the ground station. This is a great improvement on QGE, which only offers a true bearing with the distance. Rapidly provided information of this kind should go a long way towards increasing the safety during or after a D/F approach in low cloud or bad visibility. With a really accurate E.T.A. obtainable from last-minute information on these lines a pilot will be less dependent on the ground W/O's skill in providing a rapid series of reciprocal bearings, including the 180-deg.-change-round as the machine passes over. Where some form of beacon is available and permission to come in has been obtained, a QGF might even be a pilot's final requirement if his position can be accurately and rapidly determined when he is twenty miles (seven minutes in a modern machine) from his destination.

## *Lost Horizon*

ON Monday of last week, we are glad to report, the D.L.H. Ju.52 which had been missing for a month, on its return flight from China to Germany over Central Asia, reached Kabul.

The machine, in command of Baron von Gablenz, left Anhsi, in the province of Kansu, on September 3. Minor engine failure necessitated a forced landing near Khotan in Chinese Turkestan, and the crew were taken prisoner and held for some time at both Lob and Khotan. According to the *Times* report, however, civil disturbances broke out, their prison was captured, and the new commandant gave the prisoners twenty-four hours to leave one way or another. Baron von Gablenz elected to leave by air, and, after eight hours' work on the neglected engines, they took off, reached Kabul and arrived in Berlin on October 3.

**Group Capt. R. J. Bone, C.B., C.B.E., D.S.O., (right), the Director of Civil Aviation in Egypt, with Mr. Hugh Buckingham of the De Havilland Aircraft Company, to whom the former paid a visit last Friday in order to look round the works and to put in a little flying. The machine behind, as linguistic experts may gather from a study of the notice on the left, is an 86B due for delivery to Turkey.** (*Flight* photograph.)

**Commercial Aviation**

**TEST FLIGHT : The first of the new Lockheed "14s" photographed on its first flight. Apparently the machine has come up to, or even exceeded, its estimated performance figures, though it is rumoured that the Fowler flap gear demands a new approach technique. K.L.M. are the first European transport firm to place orders for this type which has an estimated cruising speed of about 240 m.p.h. depending on the particular engines installed—whether Cyclones or Hornets.**

## The Stavanger Service

ALLIED AIRWAYS' service to Stavanger has been withdrawn until next season (as had been arranged), and the D.H. 86B remains in the hangar at Woolsington, Newcastle, pending developments. There are whispers that the company is to acquire another 86B shortly. Certainly there are considerable possibilities in the North Sea service, though the financial support of such a project appears to be almost a State rather than a private responsibility.

## Long-distance Charter

SOMETHING of a record private charter was started last Saturday when McGrath and Co., shipbrokers, chartered an Air Commerce Rapide for a 7,000-mile flight to Calcutta In order that the machine might be ready to leave at dawn, engineers worked in shifts all night fitting extra tanks. The machine departed according to plan and is scheduled to arrive in Calcutta on October 9.

## Through to India

THE first regular service by Empire flying-boat between England and India opened last Tuesday when *Calypso* was scheduled to leave Alexandria for Karachi over the new marine air route in the Near East. This route lies via Lake Galilee, Lake Habbaniyeh (Baghdad), Basra, Bahrein, Dabai (on the Persian Gulf) and Gwadur. *Calypso* was expected to arrive at Karachi this afternoon.

The new service will now leave Southampton on Sunday of each week and arrive at Karachi on the following Thursday, while those in the reverse direction will leave on Saturdays and arrive at Southampton on the following Wednesdays. Eventually there will be three flying-boat and two landplane services running through to India. For the present, the second of the two weekly services will continue to be operated by landplane, as before.

## The Eastern Route

THE business of building up an air service between centres which have not previously been served is always a difficult one, and North Eastern Airways seem to be just beginning to obtain some really useful results for their pioneer efforts.

It may be remembered that, after a short period of initial operation, the company closed down its lines while keeping an office at Heston and either storing or chartering its fleet. The reason for this temporary cessation was largely concerned with the entire lack of radio facilities on, or in reasonable proximity to, their route.

When such facilities became available at Doncaster, Newcastle, Yeadon (Leeds-Bradford) and Perth, the company sprang into life again and restarted operations from Croydon. During the past year the average number of passengers carried every month has increased from a matter of 25 to something like 500, and the route mileage from 800 to about 1,600 daily.

North Easterns now operate services every week-day between Croydon, Doncaster, Newcastle and Perth, calling at Yeadon and Edinburgh by request, and another between Grimsby, Hull, Doncaster, Manchester and Liverpool. In addition, four ferry services are also run over the Grimsby-Hull section of this route.

## Western Isles Service

WEST OF SCOTLAND AIRWAYS, who propose shortly to start a passenger seaplane service to the Western Isles, are in negotiation with National Shipbuilders' Securities for the lease of a portion of ground at the former Harland and Wolff shipyard at Greenock for the establishment of their Clyde base.

Apparently they particularly require one of the slipways at the yard for their Scion and Scion Senior seaplanes. If this is obtained they should be able to start a three-times-weekly service to Mull, Skye and Stornoway within four or five weeks. If the demand merited such an action, the frequency might be increased in the Spring.

The former Harland and Wolff shipyard has been lying idle since 1928. More than two years ago it was purchased by National Shipbuilders' Securities and it has since been kept on a care and maintenance basis.

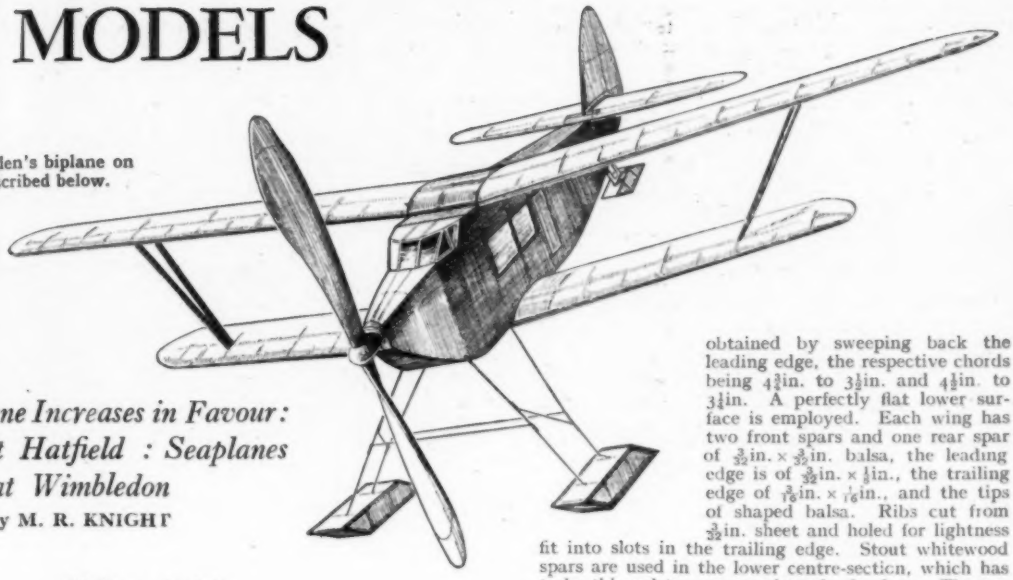
**SENSITIVITY : The latest version of the Kollsman sensitive altimeter, which is being manufactured in this country by Kelvin, Bottomley & Baird. Primarily for Service machines, this instrument has three hands indicating (as seen from the left) hundreds, thousands and tens of thousands of feet on the outer scale.**

## Compasses in Question

AN allegation has been made before the Australian Tariff Board that if the Air Navigation Regulations were enforced rigidly about one quarter of the compasses now used on aircraft in Australia would be condemned.

The Board was dealing with an application from Mr. D. Staig, of Melbourne, that protective rates of duty be imposed on aircraft compasses. Regarding two American compasses used in Australia, Mr. Staig said that to fit these was a flagrant breach of the Air Navigation Regulations. Mr. William Leslie Ellis, aircraft inspector for the Civil Aviation Board, said that it was not fair for Mr. Staig to condemn a class of compasses on the examination of one specimen.

# MODELS



Mr. J. Worden's biplane on floats, described below.

## *The Biplane Increases in Favour: Models at Hatfield : Seaplanes at Wimbledon*

By M. R. KNIGHT

### *Biplane Activity*

IT may seem strange to many readers that, at a time when the full-scale biplane appears to be disappearing, the biplane model should for the first time show signs of becoming popular. This anomaly emphasises the difference in the conditions under which the two classes function. Modellists have neglected the biplane for the simple reason that full-scale advantages do not apply. A high degree of manœuvrability is a disadvantage to a pilotless craft, inducing an unwanted sensitiveness; in such small sizes there can be no saving of structure weight without flimsiness; and, in the case of the rubber-driven machine with its varying power output, a line-up equally satisfactory under power and during the glide is more easily secured with the monoplane. Thus the performance can scarcely be expected to show an improvement in any way over the monoplane—rather the reverse, offering small inducement to the extra constructional (and repair) work.

This year there has been an outbreak of biplane construction, and it has been unmistakably demonstrated that a biplane model *can* be produced with a performance in keeping with its attractive appearance. For the first time, the annual S.M.A.E. biplane contest has attracted tangible interest. In the 1937 contest, held on September 5, there were seventeen entries, very few of which were improvised by fitting an additional wing to a monoplane (a procedure which, by the irony of things, has produced excellent results). Mr. P. Lyon (Midland M.A.C.) won, averaging 118.5 sec. on three rise-off-ground flights; Mr. A. H. Lee (Bristol W.M.A.C.) averaged 97.17, and Mr. S. R. Crow (Blackheath M.F.C.) averaged 83.8.

Biplane records have also been established by a succession of enthusiasts. In the hand-launched category, 116 sec. was clocked by Mr. C. W. Needham (Bristol) with a heavily staggered, constant-chord equal-span cabin biplane; Mr. L. B. Mawby (Ealing M.A.C.) then achieved 142 sec. with a 7½ oz. model with 415 sq. in. of wing area, and the record is now held by Mr. Crow, whose 2½ oz. 270 sq. in. cabin model flew for 204 sec. Mr. Crow also raised the rise-off-ground record to 166.9 sec., but lost it to Mr. Lee, whose 3¼ oz. 210 sq. in. model achieved 284 sec. Thus thermals are now an essential aid to betterment.

### *A Biplane on Floats*

A BIPLANE model is still uncommon, and a biplane on floats a *rara avis*. The machine illustrated on this page flies extremely well with wheels or floats, which are interchangeable. Mr. J. Worden, of The Model Aircraft Club, has produced some highly successful monoplanes, but this represents his first biplane attempt. The performance and stability are very satisfactory, and no difficulties appear to have been encountered.

Balsa is the main constructional material, and with a wing area of 230 sq. in., the model weighs 5¾ oz. Each wing is in one piece, and has small wire prongs to which are attached the rubber bands which secure it to the fuselage. The upper plane span is 33in., and the dihedral 6 degrees, the lower plane span is 25in. and the dihedral 7 degrees. The taper is obtained by sweeping back the leading edge, the respective chords being 4¾in. to 3½in. and 4½in. to 3¼in. A perfectly flat lower surface is employed. Each wing has two front spars and one rear spar of $\frac{3}{32}$in. × $\frac{3}{32}$in. balsa, the leading edge is of $\frac{3}{32}$in. × $\frac{1}{8}$in., the trailing edge of $\frac{3}{16}$in. × $\frac{1}{16}$in., and the tips of shaped balsa. Ribs cut from $\frac{1}{32}$in. sheet and holed for lightness fit into slots in the trailing edge. Stout whitewood spars are used in the lower centre-section, which has to be thinned to accommodate the fuselage. The vee struts plug into sockets in upper and lower planes.

Longerons of $\frac{3}{32}$in. × $\frac{3}{32}$in. balso, liberally strutted, comprise the fuselage, which is 27in. long, 2¾in. wide and 3½in. deep. Taking the top of the cabin as the datum line, the wings are at neutral incidence, the tail slightly negative, and the downthrust about 3 degrees. The thrust line is fairly low (1¼in. below the datum line). The rubber motor is in line with the airscrew-shaft, and the tail therefore above and parallel thereto.

Tail plane and fin are each removable. The former is 14½in. in span, the width curves from 4¾in. to 3½in., and, like the main planes, it has a perfectly flat lower surface. Leading edge and trailing edge are of $\frac{3}{16}$in. × $\frac{3}{16}$in. balsa. The fin is 4in. high and 4¾in. wide, has a $\frac{3}{32}$in. × $\frac{1}{8}$in. upright, and edging of $\frac{3}{16}$in. × $\frac{1}{16}$in.

The main floats are 5⅛in. long, 1⅛in. deep and 1in. wide, the tail float is 3¼in. × 1⅛in. × 1¼in. All are of balsa and Jap tissue, proofed with banana oil. They are mounted with their front ends raised appreciably. The main floats are mounted 6in. apart on 20-gauge wire struts. Jap tissue covering, doped with banana oil, is used throughout the model, with cellophane for cockpit and cabin windows. A 12in. airscrew of unusual shape is turned by a single skein of $\frac{3}{8}$in. rubber.

The best flights to date have been 2½ min. as a landplane and 85.6 sec. as a seaplane.

### *At the King's Cup*

MODELLISTS are very gratified at the opportunity afforded by the Royal Aero Club of demonstrating their craft to the spectators gathered at Hatfield for the finish of the King's Cup Race. The very high wind carried the models conveniently over the enclosures. The S.M.A.E. team included Mr. A. F. Houlberg, a successful pre-war modellist, with a tapered, backswept high-wing with semi-monocoque fuselage; Messrs. R. Copland and R. F. Hook with the humped-back, low-thrust-line high-wings, so popular with duration enthusiasts; Mr. S. R. Crow with a constant-chord biplane which flew out of the aerodrome and returned, and the present writer with two tapered-wing multi-sided-fuselage biplanes, one of which was safely recovered from a garden quite a distance from the aerodrome. There was even a short flight by a petrol model, Mr. W. Rushen setting his time-switch to cut the 7½ c.c. *Mighty Midget* after 20 sec., when the high-wing model glided down to a perfect landing.

### *Wimbledon Seaplane Base*

WIMBLEDON COMMON, for over thirty years a centre of model flying, was the scene of intense activity on September 12, when T.M.A.C. held their third annual Grand Rally. A crowd of keenly interested spectators watched demonstrations by innumerable monoplanes to various formulæ, biplanes, tail-less types, seaplanes, an Autogiro, and even a flying boat. The marine activities were achieved with the aid of the canvas launching tank, increased in length, width and depth since last year. Mr. J. Worden achieved a rise-off-water flight of 85.6 sec. with a biplane, and Mr. H. E.

White's flying-boat *Goose* (smaller and younger sister of *Ganda*, recently described and illustrated in *Flight*) also succeeded in leaving the water, no small achievement for a 12 oz. model.

There were contests for various classes of models, and the comprehensive programme arranged by Messrs. Orchard and Henery was successfully completed before rain dispersed the crowd.

During the Wakefield Trials, Mr. R. T. Howse (Bristol W.M.A.C.) raised the British duration record to 12 min. 4 sec. using a constant-chord high-wing monoplane with semi-monocoque fuselage and geared motor.

* * *

Some excellent model aircraft were on view at The Model Engineer Exhibition recently held at the Royal Horticultural Hall, Westminster. A report will appear next month.

# THE INDUSTRY

## New Palmer Director

AIR Commodore J. L. Forbes was elected a director of the Palmer Tyre, Ltd. at a meeting of the Board held on September 27.

## New Marconi Chairman

MR. HERBERT ARTHUR WHITE, managing director of Marconi's Wireless Telegraph Co., has been appointed chairman of the Board in succession to Lord Inverforth. Mr. White has been associated with the Marconi organisation from an early date.

## Le Moteur "Gipsy"

SOME mysterious references to Gipsy engines in French aeronautical journals are explained by the news that the firm of Marcel Bloch has acquired the licence to build the Gipsy Major. Both the Series I (130 h.p.) and Series II (140 h.p., with v.p. airscrew) will be made.

## Facts About Aluminium Construction

A SOUND and practical booklet, entitled *The Welding and Riveting of Aluminium and its Alloys*, has been prepared by the Northern Aluminium Co., Ltd. It is so capably written, well illustrated and completely tabulated that it suggests a modern text-book for the student rather than a trade brochure. Certainly anyone whose work is concerned with the subject should find the booklet of considerable value.

## The Birth of "Ethyl"

A PRE-VIEW of a film entitled "The Long Road" was given by the Ethyl Export Corporation at Bush House last Thursday. The film, which traces in a very interesting way the evolution of land, sea and air transport through the ages, is particularly fascinating when it comes to show, in slow-motion pictures, the progress of combustion in a cylinder and the way in which detonation sets in, caused by the compression of the not-yet-ignited gas on the side farthest removed from the sparking plug. The film will be shown at half-hourly intervals at Philbeach Hall, behind Earls Court Stadium, during the Motor Show.

## NEW COMPANIES

UNITED AERO PRODUCTS (ACCESSORIES) LTD.—Private company, registered September 18. Capital, £10,000 in 10,000 shares of £1 each. Objects: To carry on the business of aeronautical and general engineers, manufacturers of all aero engine products, etc. The directors are: Howard Edmund, Clarke H. Bertrand, Miller A. Langham. Registered Office: 42, Bloomsbury Street, London, W.C.1.

SUNTEX SAFETY GLASS INDUSTRIES LTD.—Private company, registered September 30. Capital, £2,000 in 2,000 shares of £1 each. Objects: To carry on business as manufacturers of and dealers in safety glass and plastic products, etc. The directors are:—Jack Davis and Alfred Rosenthal. Registered Office: Leto Works, High Street, Edgware, Middlesex.

## INCREASES OF CAPITAL

CARDIFF AEROPLANE CLUB LTD. Cardiff Airport, Cardiff.—The nominal capital has been increased by the addition of £3,000 in £1 ordinary shares beyond the registered capital of £2,000.

AIRWORTHINESS LTD., Gravesend Airport, Kent.—The nominal capital has been increased by the addition of £1,000 in £1 ordinary shares beyond the registered capital of £1,000.

CONSTANT SPEED AIRSCREWS LTD., Avon Works, Wharf Street, Warwick.—The nominal capital has been increased by the addition of £50,000 in £1 ordinary shares beyond the registered capital of £50,000.

## CHANGE OF NAME

OGILVIE AIRCRAFT LTD. (18, St. Thomas Street, London Bridge, S.E.1.)—Name changed to E. L. and O. Trading Company Ltd., on July 7, 1937.

AERO-ELECTRICAL EQUIPMENT CO., LTD. (3, St. James's Square, London, S.W.1.)—Name changed to Gambrell Electrical Equipment Co., Ltd., on August 4, 1937.

## PUBLICATIONS RECEIVED

*The Development of Sheet Metal Detail Fittings*, by W. S. B. Townend, 2s. 6d. Sir Isaac Pitman and Sons Ltd., Parker Street, Kingsway, London, W.C.2.

*Italy:* 1914-1918, by Gino Gario, 6d. T. G. Norris and Co., 16 Christopher Street, London, E.C.2.

*Sky Pilot*, by K. Langford Smith. 6s. John Hamilton Ltd., 32, Bloomsbury Street, London, W.C.1.

*Aeronautical Research Committee Reports and Memoranda:* No. 1764: On the Application to Tubular Frameworks of the Method of "Systematic Relaxation of Constraints," by M. W. Woods and E. J. Warlow-Davies, 3s. No. 1765: On Reynolds Numbers of Transition, by A. Fage. 2s. No. 1767: Abstract of a Film Illustrating the Theory of Flight, by H. C. H. Townend, 3s. No. 1769: Induced Drag Due to Washout, by C. N. H. Lock, 1s. No. 1773: Note on the Design of Corners in Duct Systems, by G. N. Patterson, 2s. 6d. H.M. Stationery Office, Adastral House, Kingsway, W.C.2.

*Journal of the Royal United Service Institution*, Whitehall, London, S.W.1. August, 1937. 7s. 6d.

*The Care and Maintenance of Aircraft*, 5th edition, 5s. Bunhill Publications, Ltd., 2, Bloomsbury Place, London, W.C.1.

*By Order of the Shah*, by H. W. and Sidney Hay, 15s. Cassell and Co., Ltd., La Belle Sauvage, London, E.C.4.

*Technical Publications of the International Tin Research and Development Council.* No. 57: Mechanical Properties of Some White Bearing Metals and Other Tin-Base Alloys at Various Temperatures by C. E. Homer and H. Plummer. No. 58: The Tensile Properties of a Series of White-Metal Bearing Alloys at Elevated Temperatures by H. Greenwood. Manfield House, 378, Strand, London, W.C.2.

*Industrial Safety.* The National Fire Protection Co., Ltd., Petersham Road, Richmond, Surrey.

*Aeronautical Research Committee Reports and Memoranda:* No. 1760: Progress of Experiments in Aero-Engine Exhaust Silencing, by A. W. Morley. 2s. 6d. No. 1,761: The Stresses in Certain Tubes of Rectangular Cross Section under Torque, by D. Williams, 4s. 6d. No. 1,766: Experiments on a Sphere at Critical Reynolds Numbers, by A. Fage. 3s. No. 1,771: Tests of Four Airscrew Sections in the Compressed Air Tunnel, by D. H. Williams, A. F. Brown, and E. Smyth, 3s. No. 1,774: Aerodynamic Characteristics of Tapered Wings with Flaps and Slots, by S. H. Hollingdale, 6s. No. 1,779: Experiments on the Use of a Static Tube in the Wing Wake and a Short Pitot Tube in the Leading Edge as an Airspeed Indicator, by Aerodynamics Staff, R.A.E., 1s. H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2.

*Hydro- and Aero-Dynamics*, by S. L. Green; 12s. 6d., Sir Isaac Pitman and Sons Ltd.

*The Art of the Admiral*, by Comdr. Russell Grenfell, R.N. (Retd.), 12s. 6d. Faber and Faber Ltd.

*Scale Models that Really Do Fly*, 2d. F. P. Sweeten Ltd. 38, Bank Hey Street, Blackpool.

*Space and Form* (Illustrated booklet describing the new Budapest airport.)

*Stabilitäts-und Leistungsberechnungen für Flugzeuge*, by Dipl.-Ing. Gerhard Otto C. J. E. Volckmann Nachf. E. Wette, Charlottenburg 2, Berlin, Germany.

*Technical Report of the Aeronautical Research Committee 1935-1936*, Vol. I: Aerodynamics, price 30s. Vol. II: Structures, Flutter, Engines, Seaplanes, etc., price 30s., H. M. Stationery Office, London, Edinburgh, Manchester, Cardiff or Belfast.

*The Mutiny at Invergordon*, by Lt. Commdr. K. Edwards, R.N. (Retd.) 10s. 6d., Putnam and Co., Ltd., 24, Bedford Street, London, W.C.2.

*Foreign Air Regulations Handbook, No. 12: Germany*, price 6d., Air Ministry, Adastral House, Kingsway, London, W.C.2.

*Playboy of the Air*, by Jim Mollison, 10s. 6d., Michael Joseph Ltd., 17 and 18, Henrietta Street, London, W.C.2.

*Magnesium and Its Alloys*, by J. L. Haughton and W. E. Prytherch; 2s. 6d., H.M. Stationery Office, London, W.C.2.

*The Welding and Riveting of Aluminium.* Northern Aluminium Co., Ltd., Banbury, Oxon.

*Handbook of Aeronautics Series: Part 1: Aerodynamics*, by E. F. Relf; 6s., Sir Isaac Pitman and Sons, Ltd.

*Seaplanes: Manœuvring, Maintaining, Operating*, by D. J. Brimm, Jr.; 10s. 6d., Sir Isaac Pitman and Sons, Ltd.

*Technical Publications of the International Tin Research and Development Council: Series D, No. 3: Mechanical Properties of Some Tin Bronzes*, by Dr.-Ing. H. Lepp, Mansfield House, 378, Strand, London, W.C.2.

*Air Publication 1602A: The Air Almanac Ephemeral Sheets for 1937, October 1 to December 31*, 2s. 6d. H.M. Stationery Office, Kingsway, London, W.C.2.

*Gran Chaco Adventure*, by T. Wewege-Smith, 12s. 6d. Hutchinson and Co. (Publishers) Ltd., 34, Paternoster Row, London, E.C.4.

## AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

*(Published September 30, 1937.)*

6440. FITT, G., and BARBER, P.M.: Brake-operating means for aircraft (471,488).
6505. WHITTLE F.: Propulsion of aircraft (471,368).
6731. ELLOR, J. E., and PARAVICINI, T. P. de: Cooling of aircraft engines (471,371).
7454. DUNLOP RUBBER CO., LTD., WRIGHT, J., and TREVASKIS, H.: Operating device for camera guns (471,212).
8484. BARTOW, J. B.: Airport lighting systems (471,260).
11407. SPERRY GYROSCOPE CO., Inc.: Level flight control for aircraft (471,381).
11854. FREEMAN, H. S., PERRY, W., and JEFFS, G. J. H.: Composition for coating aircraft to prevent ice formation (471,272).
12108. REID, G. H.: Gyroscopic instruments (471,217).
12797. BRISTOL AEROPLANE CO., LTD., and FEDDEN, A. H. R.: Exhaust systems for internal-combustion engines (471,385).

*(Published October 7, 1937.)*

24. CAMERON, P.: Aircraft having rotative sustaining-means (471,509).
25. CAMERON, P.: Aircraft having rotative sustaining-means (471,510).
3326. ARMSTRONG SIDDELEY MOTORS LTD., and PELL, L. F. R.: Built-up crank shafts (471,513).
3347. STIEGER, H. J.: Construction of aircraft and the like (471,514).
6594. VILLIERS, C. A., and VILLIERS HAY DEVELOPMENT, LTD.: Cylinder heads and valve gear of multi-cylinder air-cooled internal-combustion engines (471,533).
6671. CRANE, C. J.: Aerial-flight instruments (471,537).
6838. RADELET, F., and SCHUL, M.: Gun batteries or mountings, more particularly for anti-aircraft defence (471,550).
7024. BENDIX AVIATION CORPORATION: Semi-rotary engines (471,749).
7473. DEUTSCH VERSUCHSANSTALT FUR LUFTFAHRT E.V.: Method and apparatus for the vertical steering of aircraft (471,820).
27092. YACCO SOC. ANON. FRANCAISE: Aircraft (471,639).
2631. LINDSTROM, G. E.: Aeroplanes (471,656).
4472. D'OPLINTER, J. G. M. J.: Dual-control devices of aircraft (471,583).